WHITE'S INDUSTRIAL DRAWING

DESIGN

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White's Industrial Drawing

THEORY OF DESIGN

A

TREATISE ON THE THEORY AND PRACTICE OF DESIGN

AND THE

METHODS OF INSTRUCTION SUITED TO TEACHERS, DESIGNERS, AND ART-STUDENTS

AND

A TEXT-BOOK FOR SCHOOLS

BY

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Contents.

Introduction.

FOR the last twelve years drawing has been taught in the public schools of many of the great cities and towns of the country. It has been done with varying success, according to the wisdom of those who have had the matter in charge. In general the effort has met the difficulties of all new enterprises; it has had a large amount of prejudice to contend with, and the established order of the schools to displace, so as to find proper time and opportunity: communities and teachers have had to be educated in the uses and benefits of drawing, both as an element in education and as a factor in the industrial arts. Sometimes drawing has been ridden as a hobby; sometimes it has fallen into utter neglect; and, more frequent still, it has been taught with an entire want of interest: so that the time devoted to it has been thrown away. In this effort to teach drawing in public schools, design has become one of the subdivisions of the subject. In some cities design has been made very successful, and a great degree of

taste has been shown by the pupils; and an aptitude and genius for this work has been shown which argues well for the future of industrial art in America. The per cent of pupils who can do good work in the public schools is much larger than any one would suppose without making the trial. It often happens, that, in a class of fifty pupils, there is not one who does not draw with skill, and produce a very creditable design: such pupils as these are to have the industries and art of America in their keeping in the immediate future.

The present work is intended to promote the study of design in public schools or by private students. The author hopes he has made plain some of the most obvious and essential principles of design and of the methods of criticism. If he has succeeded in this effort, he will have the consciousness of having been of some use in facilitating this most important study.

THEORY OF DESIGN.

UTILITY AND BEAUTY.

"This love of beauty is taste."
"The creation of beauty is art."
EMERSON.

THERE is a general demand for that which is accounted beautiful. We are not satisfied with utility alone, but we must have beauty combined with it. "Every man," says Emerson, "values every acquisition he makes in the science of beauty above his possessions." Again the same author says, "The most useful man in the most useful world, so long as only commodity was served, would remain unsatisfied. But, as fast as he sees beauty, life acquires a high value."

All men desire the beautiful as they desire wealth; and nature seconds the desire, and giveth beauty to every thing of life.

It is evident, that, if it were easy to set down categorically the principles of beauty, it would not be so difficult to make beautiful objects by following them. But these principles are neither easy to define, nor to understand, and to put into practical application when

defined. Hogarth imagined that he had found *the line* of beauty. Many philosophers have tried to define beauty; but they do not agree whether it is a thing, a principle, a process, a manifestation, or a combination: and it may be, after all, that there are many kinds and many degrees of beauty.

It is evident, however, that, to produce a beautiful design, we must know upon what fundamental principles we can proceed, in order to work out our results with any degree of certainty.

We shall find that beauty depends very much upon a variety of ideas, distinct from the purely useful, and does not inhere in a simple line or in a single quality.

To design beautiful things, we must proceed upon the fundamental principles of beauty, — a method of arrangement and association, according to certain fixed rules; and these accord with certain psychological necessities of every cultivated mind. We must then become acquainted with the æsthetic law of distribution and arrangement. "Beauty," says Emerson, "is the form under which intellect prefers to study the world." We must study the necessities of the mind with reference to what it demands in the beautiful, so as to fulfill the conditions it imposes upon us.

THE NATURE OF BEAUTY.

THE ultimate art principle is the law for the production of the beautiful. Beauty is the combination of the qualities we love. It is not a thing, but an effect. Beauty is the external sign of conformity to the internal law of harmonic construction. With reference to organic law it is the stamp of excellence, hence it approximates virtue as to moral qualities. "Beauty is the mark God sets upon virtue."

Ideas of beauty accompany and are co-ordinate with the desire to attain the perfect ideal. Not to love the beautiful is to be content with the uncultured. As all true culture tends to human perfection, and the attainment of the ideal; so it tends to create in man the love of the beautiful.

Art is the effort of man to express this love. Utility feeds, warms, clothes, and defends; but beauty satisfies the heart, engages the affections, exalts the mind, as it hallows the soul. It is the source of poetry, music, and art.

"Ideas of beauty," says Ruskin, "are among the noblest which can be presented to the human mind, invariably exalting and purifying it according to their degree."

In nature utility and beauty are one; that is, they are produced

by the same cause: and so the laws of utility and beauty are one. The shell of the fish is not only useful as a house and a hiding-place, but it is also beautiful in its color and structure and texture. Autumn-leaves must needs go through the whole gamut of warm colors in passing from the green of summer to the sear, dry state in which November winds find them. The decaying log or stump must become a garden for thousands of beautiful lichens and mosses, more beautiful than any thing which art can create. The snow must appear white, green, blue, red, or purple, according as it is in sunlight or shadow, or as the light of the sky is one tint or another. Even a white house appears green against a purplish eastern sky at sunset. Nature is lavish of her luxuries, and beauty is the greatest luxury. It costs her nothing, because it is an *incident* of her utilities. Nature does nothing without adornment. She is the engineer and the artist in one; and her ornaments are not "applied," but are inherent in all her activities. Therefore we act in the line of nature when all our acts and works become beautiful as well as useful.

THE LAW OF CONSTRUCTION.

IF the subject of design has no basis of law to which its methods may be referred, and which may form the basis of true criticism, then all opinions as to excellency are mere opinions, worthy of no attention whatever; and the whole subject must be given over to the sport of mere fashion, caprice, or fancy: and the limit of his imagination is the only restraint placed upon the designer. In that case criticism will be useless, and conduce to no end. But if, on the contrary, there is a basis of fundamental law, which has its sanction in psychological necessities, then the whole subject is no longer one of chaos and contradiction, but one of order and sequence; and its principles and rules can be set down and defined, and a system of just criticism may exist, and certainty may take the place of doubt.

The forms under which design appears are very numerous, and the application varied; yet a few classes will comprehend the whole. First, there is design as applied to structural forms with reference to the distribution and form of masses, individual and concrete. Under this head all architectural forms would be included, and also landscape gardening.

Second, we have design as applied to surface decoration. This

again divides itself into two parts, — *a*, the decoration of surface or mural space by forms in relief; and *b*, the decoration of surface by forms in the flat. There is still another application of design in higher art, where questions of composition and arrangement in pictures and statues arise. But, as all these forms are amenable to precisely the same laws of composition, there is no necessity that they should be considered apart.

We propose, then, to study the distribution of forms in surface decoration. For purposes of ornament, a surface is supposed to be broken into various masses. There is to be the act of segregation before we come to the act of arrangement. Literally the surface is to be broken into pieces before we can arrange the fragments. The laws of design determine the relative size and forms of the associated magnitudes, and their co-ordination and distribution. These laws we propose to investigate with reference to their relation to and dependence upon certain psychological principles.

Every simple element used in design must have each of the following qualities: magnitude, form, position, direction, relation. Each of these qualities must be graded and co-ordinated with each other according to the laws of rhythmical[1] and harmonic arrangement. The harmonizing of all the attributes of the elements used in design constitutes the essential art principle.

Hence design is the art of arranging forms, magnitudes, lines, and colors (where colors are used) in such a manner as to produce a

[1] All good composition is rhythmical in this sense, that there are at certain intervals constantly recurring masses which are emphatic from the fact that they possess superior magnitude to those immediately preceding and succeeding. These emphatic masses become the resting-places for the eye in its movement over the design.

pleasing effect upon the mind of the beholder. Or, we may say that design is the art of breaking a given surface into different magnitudes and forms, arranged to express harmony, rhythm, unity, fullness, richness, and all other qualities which we like, and which can be conveniently expressed; so that the whole space produces a pleasing effect upon the mind. If it is rhythmical and harmonic, it is music to the eye. Schelling called architecture "frozen music." The quality of the ideas expressed determines the quality of the design.

If, for any reason, a design does not please, it shows that the work is a failure; as the object has not been attained. As designs for ornament, like pictures, are intended to please *all* cultivated persons alike, it becomes important for the designer to know upon what mental and psychological conditions pleasure and displeasure depend; *and if it is* found that certain qualities and conditions are always liked by all cultivated minds, and that certain other qualities are always disliked by the same minds, he will have a sure guide to his efforts, and can proceed on sure grounds to accomplish what he has undertaken.

THE CONDITIONS OF PLEASURE.

IT will be perceived, then, that the study of design begins with the study of conditions of our likes and dislikes.

The question is, then, by what is the mind pleased, and by what is it displeased? Let us set down some of the characteristics in external objects which are pleasing to the human mind. We delight in the evidences of forethought and invention. We like fullness, roundness, diversity combined into symmetry, system, unity, harmony, rhythm, relationship, broadness (or breadth), vastness, grandeur. We like justice and propriety, and fitness and adaptation, likeness in things dissimilar, contrast and picturesqueness. We are pleased with strength and durability. These are some of the principal qualities which always give pleasure to the mind.

The opposites of these qualities we do not like in any thing, except where utility makes them indispensable. We dislike hollowness, barrenness, meagerness, incompleteness, poverty, spareness. So also disorder, disjointedness, and chaos; incongruities, alienation, unjustness, narrowness, and littleness in a certain sense. We all dislike monotony. We do not like to see the evidence of thoughtlessness, foolishness, or imbecility.

Now, we are all agreed in liking the one class of these qualities,

and in disliking the other class. So, too, we shall agree in liking those works of art which show the one class, and in disliking those which exhibit the other class.

Let us state here a principle to be observed in all *art:* it is, that *no quality or excellence, however good or lovely when in its true place and relation, can satisfy the mind when often repeated out of its true place and relation, and left without sufficient contrast by opposing qualities.* Without it, all is chaos. In other words, every element in art must have its true *setting* or environment to give it value. No quality is good of itself. The curve of beauty, or "Hogarth's curve," if often repeated without proper contrast, becomes any thing but the curve of beauty. Beauty comes by combination, and does not inhere in special forms.

The harmonic arrangement of magnitudes and forms, of colors and lights and shades, must prevail in every design, to cover space, however much the design may be influenced by special ideas of style, motive, or peculiarity of any kind. These ideas of style, and the like, are superadded to the rhythmical and harmonic arrangements, without in any way superseding or disturbing them. There are many possible ideas which may enter into a design without in any way affecting the general law of construction as above stated, such as picturesqueness, grotesqueness, surprise, contrast, harmoniousness, oddities, conceits of fashion; expressions of softness, smoothness, roughness, or ruggedness; lively and exciting, or quiet and reposeful; ideas of forms which are modern or ancient, foreign or domestic, and native; paradoxical, comical or funny, or staid and commonplace. These, and all other ideas of significant character, may find place or expression in ordinary surface decoration, independent of the laws of distribution.

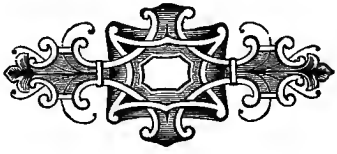
The comprehension of these fundamental laws of design will enable the student to understand the meaning of his work, and give a broader application to the ever varying fancies of his mind.

All good pictures are wrought out by the distribution, over the surface of the canvas, panel, or paper, of certain related forms, magnitudes, lines, and colors.

There are these four separate kinds of qualities to be *harmonized* into a united result, and there are certain methods by which they may be combined so as to produce the desired effect.

Hence harmonious arrangement in design requires that these elements should be so grouped that they will present to the eye and mind a family likeness and relationship; so that it will seem the most natural thing in the world for them to belong to each other, and to be brought together in that place, and for that particular purpose.

It will be seen, therefore, that an ingenious compound of unrelated elements does not make a design, but that a complete understanding of the laws of combination is essential in order to make it possible to give expression to the grand and the beautiful.



THE LAW OF MAGNITUDES.

LET us consider first how magnitudes must be distributed to produce a harmonious effect, without reference to the matter of forms or lines. We may say that the harmonic arrangement of magnitudes could not be accomplished if they were of only two kinds, — very large and very small, — with no intermediate members to bridge the disparity between them, and to enable the mind to associate them naturally into one family group. It would be like writing a piece of music of whole and sixteenth notes only.

The mind has not the power to associate those things together into complete relationship which are widely divided and put asunder by any manifest disparity, unless the intermediate steps may be in some way supplied. It demands a relationship as to magnitudes, so that it can easily and involuntarily group all the members harmoniously into a unit.

Look at any plant, a geranium for instance. We see that there are great differences in the size of the leaves, but that these differences are harmonized by intermediate magnitudes, and that, even in this natural grouping, we seldom find the passage of the eye from a small to a large leaf unassisted by intermediate magnitudes.

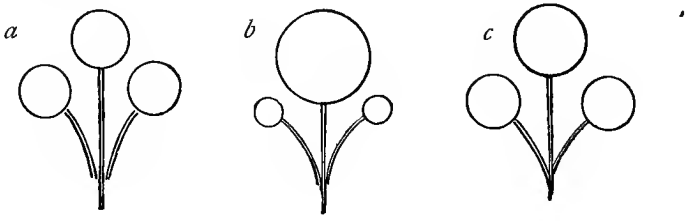
We may say, too, that, while Nature often arranges her magnitudes into a harmonious series, she very often produces very incongruous groupings.

But the harmonic law of grouping, or association, requires more than a mere diversity of magnitudes: there must be, as well, a proper proportion in the diversity.

We may say that *magnitudes should not vary by doubles, triples, quadruples, etc., but by more subtle and not so easily distinguishable differences.*

The smaller the differences in magnitudes brought into proximity, the more easily the eye passes from one to the other, and the more easily the mind associates them together, and the greater the tendency to monotony, as seen at *a* (Fig. 1); while the association of very

Fig. 1.

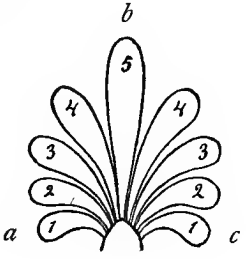


widely different magnitudes produces a precipitous effect, not unlike the association of a whole note with a sixteenth, or a very loud note succeeded by a very soft one. Let any one try the effect of these notes, and then examine the association of the magnitudes at *b* (Fig. 1), and the disparity will at once be evident.

A better proportion, according to the law of harmony, and one more pleasing to the eye, is shown at *c* (Fig. 1).

This matter of the amount of difference in the magnitudes is one of the keys to the whole structure of design. The principle is well illustrated by the Greek anthemion, in the antefix of the Parthenon, an ornament which has endured at least for twenty-three centuries, and is likely to last as many more if civilization itself continues (Fig. 2). A glance at the figure shows the cause of this inherent vitality, and continued power to please mankind; so that it is now found in all countries where art is cultivated.

Fig. 2.



Let the eye travel over the successive members from *a* to *b:* it passes over increasing magnitudes until the central member of the group is reached; descending on the right to *c*, over a decreasing series. Observe, that ascending from *a*, on the left, to *b*, there is a crescendo of quantities, and, similarly, a diminuendo, descending from *b* on the right side to *c*.

We have been speaking wholly of magnitudes, and not of form. The variableness in form we will notice farther on.

The compound rose-leaf presents a natural arrangement of magnitudes into a harmonic series, in which there will be found, usually, no two equal leaflets on the same side of the stem.

The leaves of the blackberry and horse-chestnut present similar examples of increasing and decreasing magnitudes, arranged in harmonic series (Figs. 3, 4).

Fig. 3.

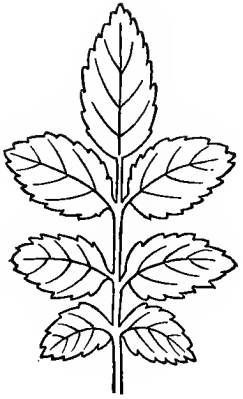
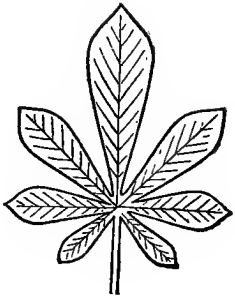


Fig. 4.



There are many other natural arrangements of harmonic series ready made for the designer, the beauty of which is apparent to all.

Take all these series in the four illustrations, and reduce each member to the same size, and see how quickly the charm is gone. They would be no longer "music to the eye," but crude forms possessing no interest.

If we take note of our impressions, we shall see that we recognize this law everywhere, at least by our feelings if not consciously. It is the law of harmony in co-ordinated diversity. It will be observed that this law of quantity determines, once for all, what magnitudes should be brought into close relation, and what should not. But there is still another condition of association which may be noted here, which is, that there may be one series of harmonic magnitudes imposed upon or placed in the midst of another quite different harmonic series. We may see a similar combination of two series on

the waves of the sea, where the large waves are all covered over and diversified with another smaller system of wavelets; the one acting entirely independent of the other. The same fact is apparent in music, where there may be several concomitant series of rhythmical quantities in the several parts, and also in each part.

In architecture the divisions of space by horizontal bands should be such as not apparently to measure each other. Thus the dado should not be a half or a third or a quarter of the height of the room. In buildings where the three orders of architecture are used, — the Doric for the lower, the Ionic for the second, and the Corinthian for the third story, — the heights of the several stories must not be equal, nor measurable at sight, one with the other. The capitals should not be apparently a measurable part of the column. There is a just law of difference in all these proportions, setting a limit to the difference on the one hand, and denying a too near approach on the other. The divisions of the frieze by horizontal bands in Greek architecture is another instance where this law prevails; neither the imposed bands, the moulding, nor the spaces measuring each other by any apparent proportion.

The human face is an illustration of nature's method of dividing spaces vertically. Although the eyes are really on the middle line of the head, the other features are so placed that not one person in ten thousand would notice the fact without having his attention called to it: indeed, the general impression among children, and many adults as well, is, that the eyes are in the upper part of the head. This is on account of the proportions of the other features. The hair takes up about a quarter of the vertical height of the head from the crown to the chin: and although the nose is about a quarter of the whole height of the

head, neither the upper nor lower limit of the nose begins on a quarter division of the vertical height, but reaches about a sixteenth above the medial line, down to within about a sixteenth of the lower quarter division; and, of the space below the nose, the divisions are equally hard to define accurately. While the legs comprise about half the length of the whole body; the division of the body above the legs is intricate, and the division of the legs by the joints of the ankle and knee are not by any fraction that could be easily read. Although nature can not be always relied upon to produce perfect art, the proportions indicated above seem sufficient to show that nature does not intend to divide up her work by halves and quarters or thirds. The position, use, and distance of a proposed design must be considered in order to determine what magnitudes should be used; that is, whether they should be small or large, few or many. It must be evident that small objects are best seen near, and larger objects more distant, according to the size, and that forms of ornament must be proportioned to the object ornamented.

We may summarize this law in the following rule: —

Those magnitudes only should be associated together which have rhythmical and harmonic relations. (See p. 16, note.)

THE LAW OF ASSOCIATION OF FORMS.

THE law of the association of forms seems to be, that *only related forms should be brought into juxtaposition in design.* That relationship, moral or intellectual, should accompany association, is a law of social life, all society being built upon this basis. It is, therefore, one of the psychological laws to which the designer must conform, in order that he may secure the best results. The mind is pleased to contemplate a well-organized group of related elements: it matters little of what the elements consist if they are congruous, and a combination of unrelated elements is always displeasing. Incongruities in literary or musical composition are precisely of the same character as in design, and offend precisely the same faculty in the cultivated mind. An illogical conclusion inconsistent with the admitted premises belongs to the same class of offenses, as bringing together in one design elements which appear to be entirely unrelated. In this particular, as in many others, design is like every thing else in the laws of its construction. The effect of the most beautiful painting may be destroyed by the introduction of a single inconsistent incident or element. One often sees the Greek elements brought into a design with the convolvulus or the geranium, or some other of our domestic plants. The incongruity must be appar-

ent to every one, and the observer at once queries why these things were brought together.

Why should the rose, the shamrock, and the thistle be made to do service in the same rosette as an emblem of the United Kingdom of Great Britain, except that it most fitly represents the inharmony of the races forced into an unwilling union? The rose makes war on the shamrock, the shamrock wars on the rose, and the thistle is an offense to each. We may say, then, that in general it is better *that only one plant should be used in the same design, especially* for elementary work in schools. With experienced designers no rule is necessary. There would seem to be another application of the rule of relationship, which may help us to avoid another incongruity in composition; and that is, that very long, attenuated forms should not be associated in a design with round, broad forms only. The effect of all such association is, to prevent the mind from assimilating them into a unit: the *ensemble* is destroyed. Pygmies and giants do not harmonize in the mind. *The mind does not readily associate those things together into a family or unit which are put widely apart by a great difference of size, form, relationship, or source.*

RULE OF ASSOCIATION.

We may set down the following rule as to forms: *Only those forms should be associated in a design which have family relationship, or are of the same kind or style.* This rule would naturally prohibit the mixing of historical ornaments, Greek with Roman, or Roman with Egyptian or Persian, or Persian with Renaissance, or any of these with our own plant-forms. These should stand alone and by themselves.

The Moorish can not be benefited by being diluted with our own plant-forms, or with any other style of ornament. It is perfect in itself, and is best when alone. All mixtures of it will but degrade it. So, also, with the Greek: it can not be mixed without destroying all of its grace and purity. It is also perfect in itself, and all admixtures degrade it. The great styles of art have grown to perfection in their own time, and are left as legacies to posterity. Each of these great historical styles is the product of centuries of growth and culture in the country where it originated; and each has a perfection and character of its own, which we can not improve.

OF POSITION, RELATION, DIRECTION.

POSITION of an element in design determines its relation to the vertical or horizontal in up-and-down designs, or in wall ornamentation, and also its relation to other elements. In regard to the several ideas which position may imply, we may say that the vertical always signifies life or energy, and strength; while the horizontal generally implies the opposite of these qualities, or, at least, the repose of inaction; while the inclined position is a mean between the two.

The character of a design is greatly influenced by the prevalence of one or the other of these positions: the designer has it in his power to produce the effects implied in these positions, but in general the prevalence of a slant line to the right or left in wall decoration is extremely objectionable. But of the influence of lines upon the eye we will examine further, in connection with the matter of direction.

OF RELATION.

The relation of an element, in design, to other elements, determines very largely the method of composition.

Elements are related by symmetrical arrangement or radiation

from a point, by repetition horizontally, vertically, or on diagonals to these.

But the relations which arise from position are entirely independent from those resulting from magnitude and form.

EFFECT OF DIRECTION.

In design, lines and forms may exert a certain decided impression on the mind by the direction they take. First, independently, in leading the eye in a certain direction. Lines produce a certain independent effect upon the eye by compelling it to follow them mechanically, as a car follows the track on which it runs; and, in certain cases of great prominence of lines, the eye is helpless to resist the influence of their presence. A single prominent line may destroy a whole picture or a design by preventing the eye from seeing any thing else; as a single bad player or singer would destroy an otherwise good musical performance by preventing the listener from enjoying the more numerous harmonies on account of the single prevailing discord. In fact, the single discord converts the harmonies into discords. Lines, by their direction, have the power to lead the eye and mind into the picture or design, or out of it. In other words, they have the power to assist or to prevent the eye from resting quietly on the picture or design, and contemplating it.

This effect, as before stated, is entirely mechanical, and can not be overcome except by the removal of the offending cause. The mind has no choice in the matter. It is completely helpless; and for this reason the observer is at the mercy of the artist or designer, except that he may turn away, and refuse to look.

DIRECTION IMPLIES MOTION.

Direction of lines or forms as elements of design implies motion, actual or potential. Thus we feel that trees and plants are growing when they stand erect; while, in most cases, the horizontal position or direction implies the reverse. The direction of a curve often implies motion in a certain direction: thus we feel, that, in the scroll (Fig. 5), the motion implied is from right to left; and the eye is compelled to follow in that direction. If that movement is not an agreeable one,

Fig. 5.

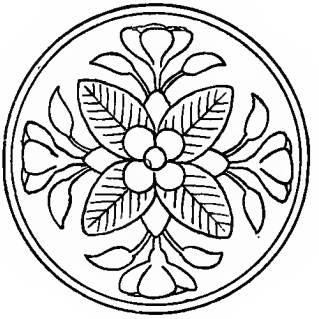
it is the business of the designer to make it agreeable, or to destroy the control of the line.

Again, direction implies motion when several forms point in the same direction; as in the case of a rosette, where the several radial forms have a prevailing direction on the same side of each radial line (see Fig. 6). But, the instant these units are made symmetrical, the effect of the revolving motion is destroyed, and repose ensues (see Fig. 7). Direction implies origin: when forms radiate from a center,

the center is the source from which they spring; and the direction of the radial lines indicates to the mind that the center is the source or point of origin. This is an important fact in design; because, if not

Fig. 6.

Fig. 7.



understood, the designer may direct the mind or eye to a point or points on the perimeter as the source or sources of origin, and by so doing carry the eye away from the design itself to a subordinate point, and thus defeat the object for which the design was made, as in Fig. 8. The corners of the square are the points from which the several forms originate, and the mind is involuntarily directed to these points as the places of origin. Such a design can only be consistent by supposing that each of the four corners of the square are so many fragments of four other squares, which have their centers at these corners. The forms are looking in from the outside, instead of coming boldly up from the center, and spreading out freely to fill the space allotted to them.

RULE.

We may say, then, *that, by the direction of the lines and elements used in design, the mind should be directed into the space occupied by the design, and not out of that space.*

We shall recur to the effect of such points of origin on the margin of a design, when we come to speak of unity.

Fig. 8.

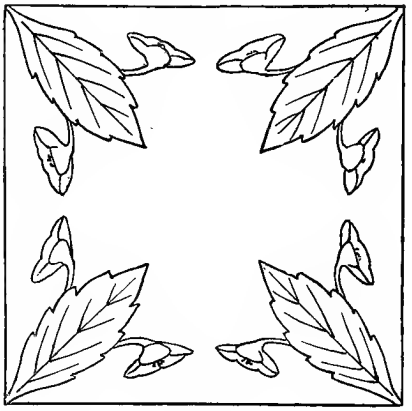
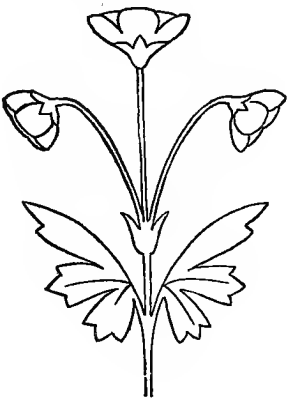


Fig. 9.



DIRECTION IMPLIES ORIGIN.

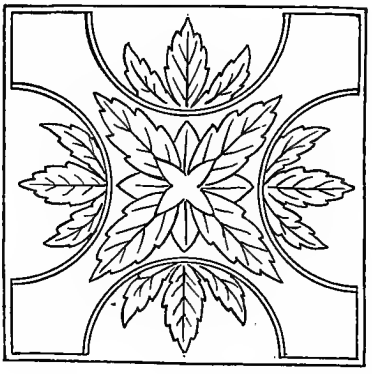
Again, direction indicates origin when forms or lines are thrown off from a central line, as in the case of the scroll (Fig. 5). The forms thrown off on either side are recognized as having their origin in the central or main line. They are thrown off by a force, as it would

seem, allied to the centrifugal, as the spray usually starts from the convex side, and the mind recognizes their origin, and is satisfied with that recognition.

When forms are thrown off from a central straight line, the idea conveyed to the mind is the same as a spray of symmetrical forms arranged on a central line as an axis: the axis becomes the line of origin, and hence the group becomes intensely a unit. Each part is at home, and belongs to its own, springing from the same source. Dissever these elements from the central radiation, and give each a different origin, the unit is destroyed, and the *one* becomes *many*.

The effect of certain lines, to carry the eye out of instead of into a design, is well illustrated in Fig. 10, where the curves are struck from centers on the margin of the square. The effect of the re-entrant curves is, to carry the eye out of the design. They inevitably direct the attention to the margin; and nothing can prevent that effect while the lines remain, except that the effect may be mitigated by the introduction of lines which have an opposite tendency. The too great prominence of lines in a design is often so obtrusive as to prevent the mind from receiving any pleasure from it, the lines being all that can really be seen. Try the experiment of filling a square with a design, with prominent stems arranged on the diagonals, and running almost to the center;

Fig. 10.

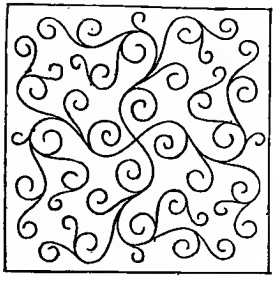


and however full the space may be, and otherwise interesting, the cross, or **X**, will be all that can be really seen.

EFFECT OF EXCESSIVE REPETITION.

We often see carpet-patterns where certain spiral curves are so abundant that it is quite impossible to see any thing but these wriggling, squirming lines. This style is, no doubt, the result of a prevailing notion, that curved lines are always beautiful; but such is by no means the case. It is true, on the contrary, that an excess of curved lines of the same quality may produce the worst monotony (see Fig. 11). This fact indicates an application of one of the fundamental laws of design already stated, that no one quality is good without proper contrast. There must be some tonic elements to give contrast and opposition to curves, or curves are of no value: hence the importance of *geometrical elements*, or straight or angular elements, in order to give the mind a relish for curvature. The control exerted by lines over the eye shows the importance of using that control wisely, in order that variety of impression may be obtained by the direction of the elements. Referring to the anthemion again (Fig. 2), we see that each element, on the same side of a central vertical line, takes a different direction. This difference of direction is in addition to the differences in size, and the difference in form and curvature, of the several parts: so that, in this simple design, the Greeks

Fig. 11.



have co-ordinated four separate series of differences. It is variety, expressed in this simple combination, that satisfies the æsthetic demands of the mind with reference to a simple harmonious expression.

The deductions to be drawn from this statement of the effect of direction in design are important, because they afford us some guide to our methods of constructing a design, or of composing a picture, writing an essay or a poem; for, in all these efforts, the varying direction given to the mind determines very largely the character of the effort: and first it will appear evident, after a little consideration, that *parallel directions are not usually pleasing.*

Fig. 12.

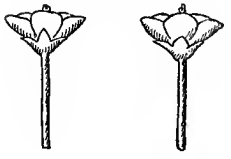


Fig. 13.

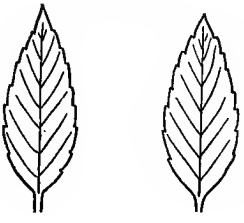
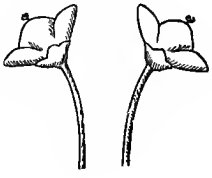


Fig. 14.



PARALLEL DIRECTIONS.

Take two flowers or two leaves with their axes parallel, and the effect is not especially pleasing (Figs. 12, 13). They seem to be standing up for some ceremonial, of which they are the unwilling subjects; while, with reference to each other, they seem to be entirely unyielding and unsympathetic. They might, so far as appearances are concerned, be culprits, brought up to answer some grave offense. Let each bend outward from the other, and the effect is entirely changed; and something like grace is expressed in their attitude (see Fig. 14).

OPPOSITE DIRECTIONS.

For a very similar reason, opposite directions are not pleasing in elements approximate to each other. In Fig. 15 the flowers turn their backs upon each other in disdain, like two persons who have become offended with each other. In Fig. 16 the offense has assumed a hostile expression. We recognize this law of direction when we sit with a friend in social intercourse. To sit face to face in absolute opposite positions would be most ungraceful; and so, too, to sit with faces turned exactly in the same direction would be most uncouth. If two persons sit and converse together, they would, of course, place their chairs in some such position as indicated by the dots (Fig. 17); or, if three persons were sitting together, the three chairs would be gracefully placed, as indicated by the second series of dots (Fig. 18). The law is as absolute in design, and must prevail for exactly the same reasons. It is a curious fact, that so many persons who display good

Fig. 15.

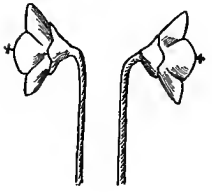


Fig. 16.

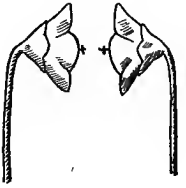


Fig. 17

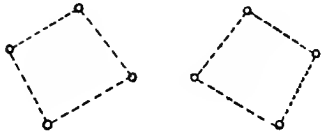
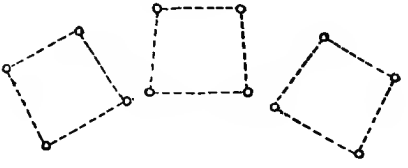


Fig. 18.



taste in such matters fail utterly when they come to deal with the elements of design, when an application of simple principles of good taste would carry them through to satisfactory results. If we take three elements in design, we may see what the demands of the several laws of magnitude, form, relation, and direction are with reference to their association. We have seen that the elements must not be of the same size (Fig. 19): hence we change them, in order to meet this demand for rhythmical magnitudes. Shall we enlarge the two outer flowers, as indicated in Fig. 20? The instant this is done, the mind is directed to the outer ones, as being the most prominent; and hence the unity of the group is destroyed, because the mind is drawn to the sides of the group, and not to the middle: we should be asking the mind to look at two centers of interest instead of one. Let us, then, make the central member of the group the largest, by a proper proportion. The effect will be, to center the mind on the middle member of the group, and make the side members subordinate, thus preserving the unity of the group (Fig. 21). As to the form of the three members, it is

Fig. 19.

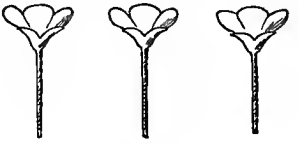


Fig. 20.

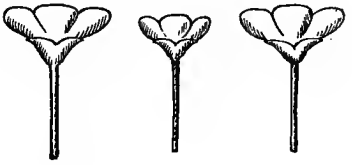
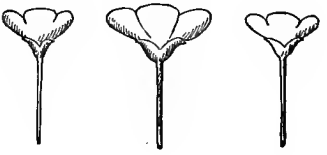
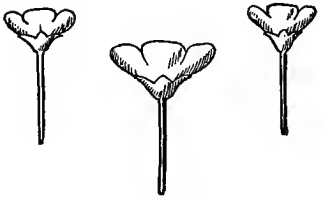


Fig. 21.



evident, from what has already been said, that it would be more in keeping with the law of unity to give the side members more length, proportionately, than the central one. If either is to be broadest, it would appear the central one should be that one, for very similar reasons to those given for making it the largest member; viz., that a broad surface centers the eye more than an elongated one, especially when it is the center of a group. We come now to the position which the three elements should occupy when grouped together. And, first, it is evident that the eye moves from the center of one mass to the center of the next, and so on; or perhaps it would be better to say, that the eye is first centered or fixed by one mass, and then by the next, and so on, until each is taken into the view and the thought. Now, there may be uses in which it is necessary to arrange the three elements on the lower level line: but it is also evident, that, in that case, the movement of the eye must be horizontal; and, although such movement may conduce to repose, it also tends to monotony; and for that reason that arrangement is not so pleasing. The instant we lift the two side members, a different effect is produced (Fig. 22): and the eye must make a downward movement toward the middle member, and up again toward the end; but this position enhances the importance of the side members, thus tending to destroy the unity of effect which we have seen to be of prime importance. If we try the expedient of elevating the central member of the group, we shall see that the effect is altogether better than in the last positions. The movement of the eye

Fig. 22.



up to the central member of the group, and down to the lateral members, is more in keeping with the effects we have desired to produce (Fig. 23): more unity, and more variety of movement of the eye, are thus secured. The larger magnitude of the central member of the group is emphasized by its elevated position. We find here again the analysis applies to the Greek anthemion, to which we have already referred. It will be remembered, that the central member is the highest, as it

Fig. 23.

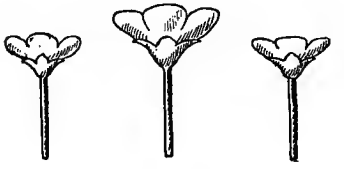
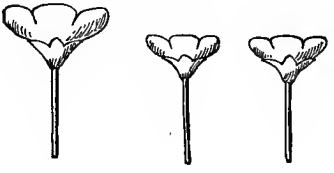


Fig. 24.



is also the largest, member of the group. There is but one other possible way of grouping the three elements; and that would be, to place the largest member first or last, and highest. This would give the effect of a one-sided hill (Fig. 24), — the half of something wanting, and so unsatisfactory to the mind and to the idea, and displeasing, on account of the movement. Hence we will let the grouping, as to position, in Fig. 23, stand, as the best we can do to fulfill all the conditions which the mind requires.

DIRECTION EXPRESSING RELATION.

Next we come to direction. We have already seen that the change of direction of the elements introduces an important idea as to the

relation of the parts. There is a great deal implied in direction. We recognize the origin of various forces as they express themselves in lines of direction. The horizontal strata of the rocks express the repose which has endured for untold ages. The curved, contorted strata speak of lateral pressure and upheavals. Concretion shows itself in concentric rings, and the crystalline force is often manifested in radial lines. With this idea fresh in our minds, if we refer to the group (Fig. 23), we see the members have no common point of origin,

Fig. 25.

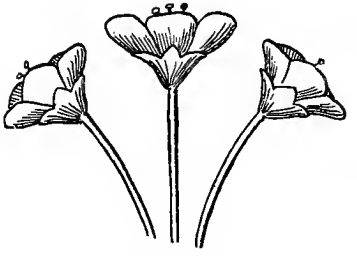
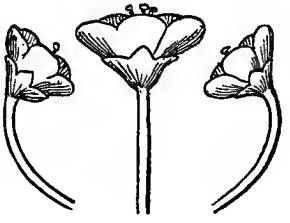


Fig. 26.



but are projected in parallel lines of force entirely independent of each other: and hence they still lack the controlling element of unity; that is, origin from a common force, from the same central point. Let us, then, alter the direction of the outer members by changing the lines of axis of the flowers, turning them outward (Fig. 25): we see at once we have satisfied a want of the mind in this grouping; namely, the desire to recognize the origin and power from which things spring, and to see every thing in its own place, filling an important and indispensable office in its own family. There is one other position in which the two

side members may be placed, in relation to the central one, as in Fig. 26, where the side members are looking in upon the central member. This position does not produce the effect of a common origin upon the mind; but the two side members of the group seem to be *foreign* to the central one, so far as implied by direction, and whether hostile or friendly is not easy to determine. Their position might indicate a reverent obeisance or a menacing proximity: at least, the arrangement is not pleasing or satisfying to the mind. Let the eye pass leisurely from one to the other grouping, and the full impression will be received. These several considerations are sufficient to determine all the points of magnitude, form, position, direction, and relation, of the combination of the three elements. Similar reasons would determine the arrangement of more elements than three into a group. It may be remarked here, that, in these simple groupings, odd numbers are most suitable; because, in symmetrical groups, there should be one central member supported by lateral pairs.

It is evident that these conditions imposed upon the designer by the necessities of the mind, in the arrangement of a simple group, conduce to the expression of a variety of ideas. From the enumeration of the several ideas above, we find that a simple group of three may be made very expressive. We see the varying magnitudes rhythmically expressed; difference in form subordinated to the rule of family likeness; difference in position, difference in direction, controlled by ideas of unity and origin, repose, and so on.

Aside from the influence that the direction of lines has upon the mind, as indicated above, there is still another effect, which we may note here. Thus, a straight line is expressive of righteousness, unbending rectitude. It is the test-line of all crookedness or curvature.

Pythagoras considered the straight line expressive of the idea of eternal duration. A horizontal straight line is expressive of absolute repose, and, consequently, of equilibrium: it is not expressive in any respect of life or energy. A vertical straight line is expressive of assertion, and hence of energy, and, when much prolonged, is symbolic of grandeur. Curved lines are sometimes expressive of affection and love, drooping curves of giving and benediction, and certain other drooping lines are expressive of lassitude and exhaustion. The gently drooping leaves of the horse-chestnut, falling in grateful luxuriance, are exceedingly expressive of grace and benevolence. And so it is that the mind receives all manner of ideas, and impressions of sentiments, from the directions which lines are made to assume under the hand of the designer.

SYMMETRY.

SYMMETRY is secured by the perfect balance of the parts on each side of a central line, which we may call the axis of symmetry. The full force of the word implies that the parts on one side of the central line should exactly measure those on the other side, whether there are one or many parts. There are five particulars in which absolute conformity is required to produce perfect symmetry. *First,* The parts on one side should balance those on the other as to number. *Second,* They should balance as to magnitude. *Third,* As to form. *Fourth,* As to position; and, *Fifth,* As to direction.

Fig. 27 has none of the conditions of real symmetry.

Fig. 28 conforms to the law of symmetry as to number, but not to any of the other conditions.

Fig. 29 conforms to the rule as to number and magnitude, but not to the other requirements.

Fig. 30 conforms to the rule of number, magnitude, form, but not to that of position and direction.

Fig. 31 conforms to the first four requirements, but not to the fifth and last, as to position.

Fig. 32 conforms to all the requirements of perfect symmetry. The

parts will measure each other exactly if superimposed. Similar parts on opposite sides are called homologous. The elements may be perfectly symmetrical, as represented in Fig. 32, without presenting any

Fig. 27.

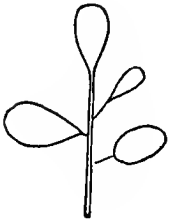


Fig. 28.

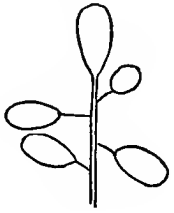
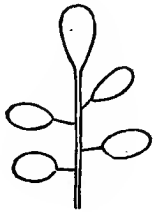


Fig. 29.



thing like a rhythmical arrangement, and for that reason may, even then, be wanting in true beauty of form: symmetry alone is not of necessity beautiful. The general effect of symmetry is, to produce in the mind the idea of perfect balance, and consequently the idea of

Fig. 30.

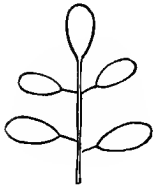


Fig. 31.

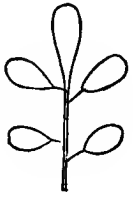
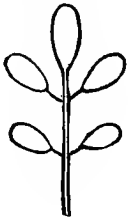


Fig. 32.



repose. When the form stands in a vertical position, it is the repose of power and energy, and not that of inaction. Again, it is sugges-

tive of law, order, and perfect development. All animals and plants tend to produce symmetrical forms when unobstructed. Trees left to grow in the open field, free from any prevailing wind, or other accident, tend to produce symmetrical forms: hence the want of symmetry in trees and plants is a sign of accident, hardship, and struggle; hence they often become picturesque, their gnarled one-sidedness showing the record of their struggle for existence. Symmetry, then, is a sign of freedom from accident, a sign of a happy existence.

The record of the struggle for life is seen in the trees which grow on the edges of forests, their branches being mostly on the side of the open land: for trees put out their branches for light and air; and, if these are shut off on one side, they seek them on the other. Trees growing on some shelving bank, giving away year by year, strive to regain the vertical position by bending upward with each succeeding year's growth; thus, after a long period, assuming curved forms, which tell the whole story of their effort to resist the power that would lay them low. But the symmetry of trees seldom, if ever, approaches the perfectly symmetrical form indicated above. The forms they assume are only apparently symmetrical. Symmetry may be either real or only apparent. Apparent symmetry results where the parts on each side of the line of symmetry, or axis, seem to balance each other in the several particulars; but, in reality, they do not do so, only so far as to give the general impression of balance to the mind. Capitals are often made in this way apparently symmetrical, but still having all the *effect* of balance and proportional measure; in this respect resembling the degree of symmetry attained by trees when left to grow without hinderance according to their natural tendencies.

Unsymmetrical designs are often very beautiful. The Japanese are very happy in this style of ornament, and most frequently the elements they use are naturalistic in form and arrangement. We are apt to assume the naturalistic form and arrangement when we forsake the truly symmetrical. If, for instance, we wish to ornament a plate, we can introduce a single sprig crossing the field to be ornamented, extending from one side full into the plate. The sprig may be drawn true to nature: in fact, it may be a true picture of a twig from the apple-tree in full bloom, with a butterfly lighting upon it, or hovering in the air. This form of ornament would be natural in both form and arrangement: it is pictorial simply. Of course, the word symmetrical does not apply to it, except in a very general and distant sense: so, too, with real pictures; they should never be perfectly symmetrical. A face painted in exactly front view is always very disagreeable to behold. We always wish to avoid the downright front view.

A one-sided landscape is often disagreeable for its want of proper balance, and we feel sometimes like cutting away a part of the canvas in order to restore the equilibrium. But a truly symmetrical picture, according to our definition of the word, would be still more objectionable; because it would degrade it to the level of a piece of ornament only. Hence there comes to be a secondary and general meaning to the word, which is significant of that general balance of parts which goes far to insure repose, while it does not approach to absolute measure. In this sense only can much of Japanese ornament be said to be symmetrical.

The general tendency of English ornament is to assume the true symmetrical, with its general accompaniment of conventional forms as opposed to natural.

CONVENTIONAL FORMS.

WHEN the general or geometrical form of a leaf or flower or sprig is drawn, with many of the minor features and accidental markings omitted, the leaf, flower, or sprig is said to be conventionalized; that is to say, the natural form has been converted to a form suitable only for ornament. Considered with reference to the beauty of full natural forms, it is evidently a degrading process; but with reference simply to the beauty of line, and facility of arrangement, it is an elevating process. For, in ornament, we are not supposed to be true to all botanical facts; but we use plant-forms because they enable us to arrange magnitudes and forms into rhythmical and harmonic groups, which affect the mind with a sense of the beautiful. It is, then, the business of the designer, as it is also of the artist, to show us his conceptions of the beautiful as he discovers them in nature. The bee extracts the honey from the flower. The artist extracts the beauty, and gives it to us without the lumber of a thousand useless accidents. He is not servile to the facts which will not aid him, but he seeks only what will serve his purpose. This is true of all art, and of none more than of landscape art. A thousand incidents open to the view would, if represented, not help, but only hinder, the artist. Therefore he disregards them, sets them aside, and

proceeds directly to his purpose, seizes upon the elements of form that will enable him to compose his visible music, — the harmonies and rhythm of magnitude, form, light, shade, color, direction, and position. All these he combines into his discourse, his poem, his picture. This is art; and, in it, there is something akin to the *selection* of form, which we call conventionalism in ornamentation. In each case there is a direct motive and end to gain, and all useless incidents are thrown aside as of no avail. The great historical schools of ornament — the Egyptian, Greek, Roman, and Moorish — are eminent examples of this process of selection of that only which suits the ends of the artist. All of these are far removed from any attempt to imitate plant-forms. The Moorish and the Greek abound in the purest lines of grace, derived, no doubt, originally from plants, but now so far removed that it would be lost time to try to trace any resemblance to any particular plant. The anthemion of the Greeks is said to be a conventional form derived from the honeysuckle. This may be true; but more probably it was a pure fabrication, which grew into being step by step, by the efforts of successive artists, until it became almost a national emblem. But it is found, also, in the ornament of the Moors, adapted to their peculiar methods. It is also seen in Persian ornament, adapted to their peculiar style. The Egyptian used the conventionalized forms of the flowers of the lotus and of the papyrus for capitals and numerous other ornamentations. Egyptian ornament may be recognized almost always by the presence of these types.

In Roman ornament we have the ever-present *acanthus molis* as the basis of that style. It is the typical element (see Fig. 5). It assumes a profusion and rankness, so to speak, unequaled by any floral type in any other of the ancient styles. The real form of the plant

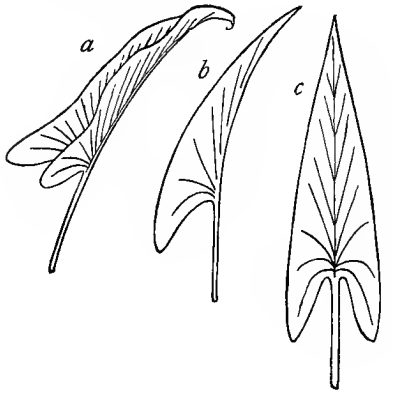
itself becomes as clay in the potter's hands, and is fashioned into a thousand different forms for as many different uses and positions. It assumes all proportions and lengths, limited only by the desire of the artist. Seldom, even in ancient styles of ornament, has a single conventionalized plant-form been required to do so much service.

It is curious to note, that some half-dozen or so of conventionalized plant-forms have furnished the elements of ornament to three of the most renowned nations of antiquity. In this respect modern nations are unlike the ancient. We use every form indiscriminately, ancient or modern elements, with natural or conventionalized forms of plants. This omnivorous tendency is, to a certain extent, the result of the very extended intercourse of modern nations by the means of commerce, literature, and travel, and partly, it may be, from a want of a settled national taste.

We have, then, the sanction of all ancient nations in the use of conventional forms of plants for ornament; and it is presumed, from this weighty sanction, that no defense of such use is needed. But there is a strong tendency to the use of natural forms in place of the conventional. By natural forms we mean pictures of objects, either in outline, with or without light, shade, and color. Hence there comes to be a *pictorial ornament*, which is distinguishable from ornament formed of conventional forms. It is questionable how far this tendency is legitimate, and what limits it should take; and this question will be determined, like all others, by the people. What the people want, the people will have, until they have enough of it. If they desire pictorial ornament, they will have it; and, if they prefer conventional ornament, they will have it; and there is no need of any central authority to determine such matters, as some would have us think.

Conventional form, as distinguished from the natural, may be illustrated as in Fig. 33 : *a* may be the natural or pictorial form of the leaf of the calla lily, and *b*, etc., the conventional forms of the same. There may be as many modifications of the conventional forms of a plant as there are designers to draw them, there being no exact limit to the artist's liberty in dealing with his elements. In general, the conventional form expresses no relief except when relief is actually given; while the pictorial form always implies more or less relief.

Fig. 33.



It will be inferred from the foregoing remarks, that the conventional form derived from a plant is really more useful for ornamentation than the true picture of the plant. It is the rejection of all that is not directly useful in securing the result required, — in the words of Michael Angelo, "the purgation of superfluities." Since, then, the object of using the conventional form instead of the pictorial is to secure the expression of the beautiful in the shortest way, without especial regard to the minor facts of botany, it follows, that as wide a departure from the pictorial form of the plant may be made as the necessities of the case may require; remembering always that the artist is superior to his means, and that his mind subordinates every element to his use, and co-ordinates all into a unit of harmony and melody. The pupil should be early taught to draw his conven-

tional forms from the plants themselves, after making a drawing of the plant as given in the plates of plant-forms in this volume. The conventional form of a leaf is easily obtained by pressing the leaf in a book, and drawing the general form of the leaf with or without any representation of the toothed edge. The front or profile form of the flowers and bud is taken in the same way, as the form most suitable for ornament.

RADIATION.

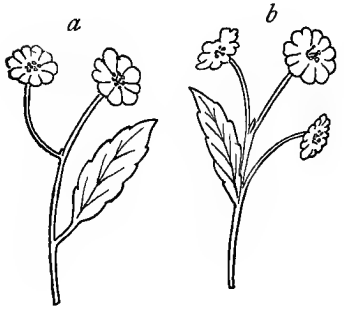
The idea of radiation has already been alluded to under the head of "Direction;" but radiation has a different signification, and one that requires a more extended notice. When a square or circle, or other polygonal form, is filled by the repetition of a unit of design about a center, on several radial lines which divide the space into sectors, the form is said to radiate from the center, as in Fig. 6. The fact of radiation implies that all these units, or sprays, originate at the center, whether the stems are visible or not: consequently the idea of radiation tends to secure unity. Again, since radiation implies origin, it directs the mind to the point of radiation, as has been observed with reference to Fig. 8, where the points of origin are in the corners of the square. Hence we must adopt the rule, *that points of radiation must not occur on the margin of a design.*

TANGENCY.

Tangency of stems in design is closely allied, in its effect, to radiation; as it directs the mind to the parent-stem as the source of origin of the sprays, as in Fig. 34 *b*. Each side-spray is joined to its parent-

stem as a tangent. *A line is tangent to another line when it touches but does not cut it if produced.* Tangency of stems is the law of union in all true ornament. Any other method of union is an offense to our sense of fitness. Sprigs may be thrown off as tangents, either from straight lines or from curved lines: the effect is the same. Let the eye pass from *a* to *b* in Fig. 34, and see the difference in the sensation produced. At *b* we have the tangential union of stems. It is graceful and satisfactory. At *a* we have a union of stems that violates all sense of grace and fitness. The lines, if extended, would cut the parent-stalk. All good ornament conforms to this law. See how all Roman ornament conforms to it. Greek ornament never violates it; and the Moorish, also, is a complete illustration of the importance of this law to all true ornament.

Fig. 34.



It may be said that Nature often violates this rule, and why should we not copy Nature? Let Nature violate the law whenever she will; but let us always consider that *Nature is not art*, and that *Art is more than to copy Nature.*

FORMS OF REPETITION.—ALTERNATION.

TO cover space by a single unit requires some method of repetition. *First*, A unit may be repeated about a center in equal divisions of a polygonal space. This is a common method in rosettes or designs, simple or elaborate, to fill circles, squares, and other polygons (see p. 119).

Second, Horizontal repetition, where a unit of design is repeated in a horizontal band. Units repeated in this way should not have a horizontal direction themselves, but should be either vertical or inclined, or in the form of the scroll. Repetition in circular bands is essentially like horizontal repetition, so far as principles are concerned. We may suppose that a horizontal band of ornament is simply bent into a circular band, and the one will answer every purpose of the other (see, for horizontal repetition, p. 113, for circular repetition, p. 115).

Third, Vertical repetition. This is essentially different from the horizontal, inasmuch as the forms used must of necessity have a general vertical trend, or direction, as well as the band in which they are placed. It has been said, that, in horizontal repetition, the forms must not have a horizontal direction, for the reason that the horizontal does not imply life and energy; and, furthermore, if the elements tend in

the same direction as the space itself, the parallelism would be objectionable, as producing a sense of monotony. The vertical direction is essential in both forms of repetition for like reasons.

The repetition may be of the same unit, or an alternation of two or more units. Alternation is always the more pleasing.

Fourth, Repetition upon diagonals or opposite slant-lines. This form is very common for covering broad surfaces, and is used for oil-cloth, and other carpeting, wall-paper, inlaid floors, wall-tilings, etc. Of this method there are several varieties. A simple unit may be repeated in geometrical spaces recurring diagonally, with reference to the horizontal and vertical (see Fig. 35); or there may be a repetition

Fig. 35.

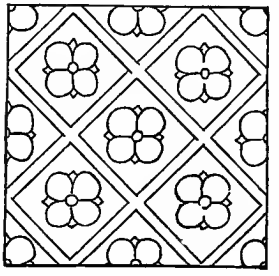
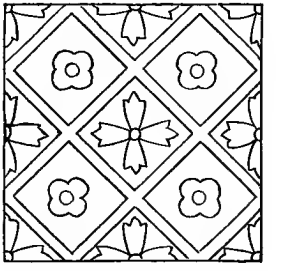


Fig. 36.



of two units alternating with each other, as in Fig. 36; or a single unit repeated consecutively in alternate diagonal bands.

A framework of diagonal bands is frequently used in this style of repetition, and often with good effect. A continuous flowing vine is often employed as the source of the forms to appear in the spaces, an alternation of forms being employed, as, for instance, a leaf, or leaves

and buds, in one space, and a flower or flowers, and leaves or buds, in the next, and so on. There is another form of repetition, where a single unit or two units are repeated in a horizontal, vertical, or diagonal direction without any marking-off of the space by geometrical lines. This form of ornament is called a powdering of the surface. It is often a very useful method, and pleasing effects may be obtained if a proper subordination is preserved between the shade and color of the ornament and the ground. In this kind of ornament the eye passes from one mass to another, as to so many centers of attraction. If two units are employed, a proper relation should exist between the two, so as not to make too great a break in the continuity. Also avoid giving rise to monotony by too great a similarity.

It will be noticed, that, in all these forms of repetition, the eye is invited to travel in the direction of the repeat. The eye naturally and almost inevitably follows along a horizontal band, and a vertical band exerts a like influence; but, when the repeat is on two opposing diagonals, the effect of direction is somewhat neutralized. Each of these methods produces an effect of its own. Horizontal divisions of a wall of a room tend to make the room look lower, while vertical bands add to the apparent height.

Horizontal bands, of strong contrast in dress, have the effect of severing the figure; while diagonal bands disturb the equilibrium of the figure. These effects are incident to the control these bands have over the eye. Vertical stripes have the effect of making the person look very prim and tall, and hence should not be worn by very tall persons, if at all.

ALTERNATION.

Larger and smaller masses are frequently brought into proximity, the two always presenting some difference of form as well as of size. This alternation of elements is pleasing to the mind, because it prevents monotony. The eye passes from the center of one group to the next, and is treated to a different impression at each point of rest. In horizontal bands these alternate masses should lead the eye to an alternately higher and lower point, and they should not have their centers on the same level. This gives an additional element of variety. Compare the effect of the two arrangements in Figs. 37 and 38: Fig.

Fig. 37.

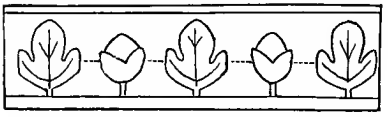
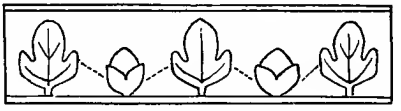


Fig. 38.



37 is monotonous, because the eye is led straight across the space, parallel to the sides of the space; Fig. 38 is more pleasing, because a different motion is given to the eye, as indicated by the dotted line. This is another effect which illustrates the force of the law of *direction*. The same law of motion demands a difference in form of the alternate masses, because the contour of each mass causes the eye to follow it; and hence the different impulses given the mind at each point of rest, — the centers of the masses themselves. It is obvious, that alternation of units, both larger and smaller and of varying form, and in varying positions as to a straight line, has in it several elements which the nature of the mind demands in what it looks upon.

We might go farther, and note the absolute necessity of this principle in all that pertains to entertainment, or even to pleasurable action of the mind. The taste must have an alternation of flavors; the sense of smell, varying odors; the ear, an alternation of harmony and discord, and so on. In a word, this demand is a law of the mind; and, in designing, we recognize the law, and work according to the rule laid upon us.

IDEAS OF FULLNESS.

IN the first efforts of pupils, there is usually much difficulty in getting sufficient fullness in design. We have said that the mind desires fullness and not sparseness. Hollowness and meagerness the mind will never willingly accept.

If, on looking at a design, the mind is not satisfied in this one respect, possible excellences may be disregarded or unappreciated in this bad company. How much fullness is required? Simply enough so that no one will ever think there is something lacking in this respect. Too much fullness is as bad as not enough. A design must not be crowded with elements. "Enough is *better* than a feast." There must be no regrets on either hand. "Neither poverty nor riches" is the rule here. *Enough* must always be regarded as the highest degree of riches.

No particular rule can be given for the proportion of space which should be covered by the elements of a design, and what proportion of space left uncovered. It depends altogether upon the kind of forms used, whether round, broad, or long. If long, narrow forms are mostly used, it would be difficult to cover as much of the space as would be easily covered by broader and larger forms. Again, the use and position of a design must determine what forms are to be used, and

the colors and lights and shades to be employed; and, in fact, all other incidents of the particular use to which the design is to be put will have to be considered in determining the quality of the elements. The idea of fullness is directly connected with the idea of *plenty*. This is familiar to every one. We all know what it means; and yet to apply the principle to design is not, perhaps, our habit. We all know that a table spread for our entertainment does not look inviting if it impresses us with a sense of meagerness, scarcity, and want. These entertain no one who is to feel the effects of them. The whole of the life of most men is a constant war against them, a struggle both night and day, year out and year in, to put them farther and farther away; and when once a man has vanquished these enemies of himself and of his family, and can say, "Henceforth I can go without fear of want or poverty," how like a free man he walks forth among his fellows! He feels that the earth is made for him, and he for it. Now, to this universal sentiment of love for fullness and plenty, and of abhorrence for their opposites, all art must conform. There must be no sense of *want* in our design. Our music must be full and rich, and plentiful in its melodies. Our pictures must be rich in gradations of form, light, line, shade, and color. The mind should be impressed with the idea that nature and art are at least above *want*. A picture with little or nothing interesting in one end of the canvas causes us to wish to cut off the useless canvas, in order to get rid of the unpleasant impression. Perhaps some artist shows us a picture with a broad extent of pasture-land or field, without variety in color, without an object of interest to catch the eye, or to relieve the monotony in the foreground, over which the eye must pass before it comes to the hill-top crested with trees, through which the setting sun is seen in glowing

colors, — the single idea which the artist had to express, and which he expressed without going to Nature to see what wonderful minor tones, and incidents of form, and gray lights, she would add as so much surplus wealth to her evening farewell. Do we not feel that this barrenness of a foreground, which fills two-thirds of the canvas, is an offense against our sense of fullness and completeness, of which we have a right to complain? We will admit that the view through the trees on the hill-top is pleasing, but we must deduct the displeasure we feel in traversing the desert foreground from the pleasure we feel on looking at the warm colors through the trees; and the pleasure must be great, or the balance of pleasure will be a minus quantity. It is true, that such barren passages are often intended to give a relish by contrast for the thing the artist wishes especially to show. But mere poverty and emptiness can never operate in that way: they are always debts which are to be deducted from the sum of pleasure which we obtain from a work of art. This want of fullness may pertain to all of the several elements out of which a picture is constructed, — objects affording masses and form, shades and shadows, light and color and incident.

An excessively cold, gray picture must have many excellences to counterbalance the chilling effects of its color. In design, this effect of fullness is of paramount importance. We may see on the tea-plate, the cup or saucer, or the wall-paper, the full expression of the idea of plenty without a hint of the poverty which we may otherwise feel. And in this respect the arts of design are an added wealth to mankind, enriching almost without cost.

In designs to cover space an effect of sparseness will be felt if there is too much space left uncovered by the forms of the design.

The teacher will find in the work of the pupils plenty of examples illustrative of this defect, and will be able to detect and impress the idea of these faults upon the pupils by calling their attention to designs which contrast with each other in this respect. Let the pupil compare a design that is full and complete, like Fig. 130, with one of an opposite character: the difference will be apparent at once. Let the pupil once obtain this idea, and he will be no longer troubled with the production of meager work. But meagerness often results from a poverty of ideas as to the methods of arrangement. This can only be overcome by a careful investigation and analysis of the whole subject of construction: consequently the teacher must be content at first to obtain even meager work, counting it a good omen if a single idea is grasped by the pupil at each successive lesson; for we may be sure, that, if the art of design is any thing worth learning, it will require much time and patience to acquire the art. All arts quickly acquired are of small value when obtained; and we may say, that design stands in no danger of becoming one of the quickly learned arts. The teacher, therefore, must wait for growth and development.

The idea of fullness has its closely connected evil, into which the designer is ever liable to fall. Fullness is easily degenerated into plethora, as an assemblage may readily become a crowd or a mob. Too much fullness in a design destroys its usefulness, and makes it worse than a vacant space; just as a gorged stomach is worse off than an empty one, since all the nourishing elements of the feast are liable to become so many poisons to the system. Pictures are often so overloaded, that no one good thing in them can be appreciated; because there is no time or room to see them, — no time, because every thing demands attention at once; and no room, because every thing is in the way.

A sense of confusion results from a crowding of elements. How is the designer to know when there is enough in his design and not too much? He will know that he is right in this respect when he avoids meagerness on the one hand and plethora on the other. There is an example of art in which these qualities are admirably balanced. The Flight into Egypt, by Merson, is one of the most admirably composed works of art recently exhibited. The subject is the flight of Joseph into Egypt. The scene is in the desert. The time, midnight. There are but few objects in the picture, but it is full and complete. The granite sphinx, with face upturned to the midnight sky, stands in the foreground. In its outstretched arms sleeps the mother and the infant child; and in front of the great sphinx, resting his head on the corner of the base, is the figure of Joseph, covered with a gray mantle reaching to his feet. A few smoldering embers send up a thin thread of smoke straight as a plummet-line into the starry sky. Near by, a teddered donkey, on which the mother and child had ridden during the sultry day, is cropping some thin herbage. A soft, tender light illumines the sweet face of the sleeping child, and is diffused around over the mother and sphinx. This is the only high light in the picture: on all else — dry sands, donkey, and mantle of the sleeper, on the loose garments of the mother, and on the upturned granite face — falls the gray light of the stars. It is midnight on the desert, and the weary travelers sleep. The babe, who is to be the author of a new religion, which is to reform the world, sleeps in the outstretched arms of an emblem of a religion which was old when the pyramids were built.

Is there enough in this picture? Who could add to it a single line and not spoil it? It is complete in its fullness.

Examples of error in respect to fullness might be referred to; but the student will readily supply the omission by his own observations, both in ornament and high art.

It is enough to point out the law upon which all successful art must proceed in this respect. Ideas of *richness* result from fullness to a great extent, although richness in design depends somewhat upon the kind of forms used. There are forms which of themselves suggest richness, such as gem-like flowers, which sparkle with light, and are full of quick lines. These, if sufficient in quantity, and interspersed with leaves which are broader, and buds which are smaller, all arranged into a rhythmical unit, produce an idea of richness, wealth, and costliness.

It will be readily understood that design may appear to be full, but not rich or costly. The forms used may suggest an idea opposed to richness or costliness, and so a design may possess the one quality and not the other. Bands of ornament on walls, fabrics, vases, etc., may be made to look flat, or broken up into masses like sparkling gems. It is important that the designer should know how to produce either effect at pleasure without disturbing the quality of fullness. It will be seen, therefore, that mere fullness or abundance does not of itself produce the idea of richness; and, on the other hand, it may be said that richness can not be produced without the idea of fullness. We are now considering the elements of magnitude and form independent of color. Richness of color is entirely a different matter, and, to a certain extent, independent of the elements receiving it; but our analysis relates now only to the distribution and arrangement of the elements to produce certain desirable results.

IDEAS OF THOUGHT AND INTENTION.

ONE of the main sources of delight in the contemplation of a design is derived from the evidence of forethought which is displayed in the production. It is not necessary that we should think of the intention of the designer in order to be affected by his work: it is only necessary that the mind should be impressed with a sense of order and fitness, and all that pertains to the feeling which results from seeing the right thing in the right place. Hence the order of arrangement, symmetry, sequence, proper selection, and adaptation go to make up the impression of *forethought*. And especially the *absence* of every thing that would suggest accident or carelessness tends to impress the mind in the same direction. There can be no design in accident. But every change from natural representations which adds a new and pleasant impression of some new thought, feeling, quality, or sentiment, or relation, gives pleasure; because the decorated surface, the design in question, has just so many ideas to give, so many thoughts to express. We are obliged to look, and receive these impressions it has to give. We feel that somebody has made these forms speak to us, and this is much more to us than it would be if we knew that this effect and combination came about simply by accident.

From this it appears that any impression of the want of forecast, want of knowledge, want of taste, or a sense of foolishness or imbecility, would be destructive of all good effects produced by a design. It therefore follows, *that no element or form which is of itself meaningless can be admitted into a design. Intention* must be apparent everywhere, as without it all results are simply accidental. Let the teacher make this a rule to which every pupil must conform. There must be *thought* and *intention* in every stroke of the pencil. There is no design in accident.

INVENTION.

The element of invention, which results in curious and unexpected combinations, is pleasing to the mind of the observer. We are delighted with a beauty which is rare. Ingenious expedients and subtle combinations, if they conform otherwise to the laws of harmonious arrangement, and all the other conditions which the mind demands, are always qualities to be admired: they are another source of pleasure to the mind. But there is one important consideration which we must note here, which may modify our pleasure in the contemplation of these qualities; and that is, that the intention to appear subtle and ingenious must not be too apparent. We would much rather the artist would be subtle and ingenious because he can not help it. "It whistles itself" is the statement of a fact we like to recognize. The noise of the crank which moves the machine is never pleasing: it destroys the illusion which might otherwise entertain us.

CONTRAST.

IT seems to be a condition of nervous excitability, that, in order to be pleasurable, an impression *must not* be prolonged precisely in the same kind and intensity. No one sensation can long be endurable. A single musical note can not long give pleasure. In its proper place in the progression of musical sounds, it gives a momentary delight, or, more properly, sustains its part with the rest of the series in the production of a pleasing sensation; but, when prolonged, how destructive of all pleasure it becomes! All pleasure derived from sonorous sensations is dependent upon a constant change of pitch, duration of notes, volume, etc. The pleasure we derive from all visual sensations is also dependent upon a constant variableness of magnitudes, forms, directions, positions, lights, shades, colors, etc.; and an unvarying expression of any one quantity can not be endured unless it is broken into and diversified by a constantly recurring quantity which stands in contrast to it. In pictures, if one color predominates without its natural contrasting color, that color becomes an offense to the eye, and is as much out of place in the pictorial harmonies as mere noise is in music. This result is, no doubt, due to the weariness resulting to any one nerve-fiber from being made to vibrate too long to any one wave-length.

A curious confirmation of this doctrine is found in what is called the ocular spectrum. Let the eye be fixed upon a round red spot in a good light for a few seconds, then, upon turning the eye away, and looking upon a white surface, or closing the eye altogether, the spot will re-appear on the white paper, or will be seen with the eyes closed: but it is of a different color; it is no longer red, but green, the complement of red. Why do the nerve-fibers set up for themselves the sensation of green after being treated to the effect of red, if not to restore the *equilibrium* of sensation, which is destroyed by being subjected to the unmodified influence of the red? It is in this sense that uncontrasted color is an offense to the eye. If we admit that all nervous sensations require the responsive presence of contrasting effects, we shall have grasped one of the fundamental conditions of all pleasurable sensations.

It appears to be a psychological law, that pleasurable sensations result from their variableness and contrast within certain fixed limits: therefore *contrast* is a necessity of all art. In design and painting, contrasting elements give value to each other, as contrasting nervous activities enhance the value of each. The value of a color depends upon the presence of that which will cause it to appreciate in value. Color in pictures is useful only under these conditions, and it becomes precious when placed in its proper relation. In all other situations it is simply dead color, of no value whatever in an æsthetic point of view.

It is for these reasons that the want of contrast ends in what we call monotony, which simply means the nerve *sickness* which results from an unwelcome strain in one direction.

This result follows from the repetition of the same magnitudes, the

same forms, the same directions or positions, as have been before mentioned. Thus it happens that curved lines are made more pleasing by the presence of either straight lines or broken lines and angles. Rounded forms should be associated with those more elongated, etc. But the law of contrast goes farther, and demands, that, in design, the space should not be equally covered, but that there should be parts much less filled, or filled with less exciting forms. Geometrical forms or elements are of great value precisely in this respect, that they give value to floral elements. Straightness, angularity, and exactness sweeten flowing lines, and render them of the highest value.

In the best periods of decorative art this principle has been recognized and followed. Flowing lines are never left unassociated with rigid forms. We recognize this law in discourse and in music and poetry, and, in fact, in all art. The speaker who takes a high key and strained voice through his whole discourse, becomes exceedingly tiresome; but how charming to listen to one whose discourse runs on at times in a genial, pleasant flow of mere statement, where statement only is necessary, and rises, when the sense demands, into vehemence and climax! Listening to such a speaker is like riding through a pleasant country, where hill and valley, smooth meadows and rugged crags, and mountains, sweet sunshine, and somber shadows cast by passing clouds, meet the eye at every turn, as we ride over hill, through vale, over bridge and stream, through drooping willows and thick alders, under the shade of towering pine, or by mossy ledges. So the skillful orator conducts us along the devious path of his discourse. He is forgetful of himself; and we forget him, and are alive only to the successive views he presents to our imaginations, beguiling us into sweet forgetfulness of all else. That is the highest of arts; and

it depends upon the law of contrast as one of its principles, in association with others of equal importance.

The effect of excessive contrast is, to present that which is ridiculous and out of keeping, producing unrelatedness by too wide differences. It is only in moderate, co-ordinated contrast that the mind finds its truest pleasure. Too great a contrast in light and shade in the parts of an ornament which are contiguous, cause one to fall away from the other, and to be practically disunited. Many dwelling-houses are now painted with trimmings so much darker than the groundwork of the building, that they become entirely detached, so far as the *ensemble* of effect is concerned, becoming separate objects of observation, and resembling an iron framework, in which the house is set. This effect we may call precipitous, because of the great distance expressed between the color of the trimmings and that of the body of the house. It is, in truth, a precipice in shade, — a clear leap from one to the other. We would much rather not be obliged to look at the moldings and casings of doors and windows when we only want to see the house. We might multiply examples of excessive contrast, but the reader can readily supply the want of further illustrations.

Moorish ornament furnishes a notable example of the use of contrasting forms in the flowing lines and graceful figures apparently derived, as remarked before, from plants, but so far removed from them as to have lost all individual resemblance. These are set in a framework of geometrical forms, more or less exact and mechanical; the space itself being first cut up by curiously devised geometrical bands, the spaces between being filled with graceful forms, into which, also, words and sentences were frequently introduced as a part of the ornament.

Contrast is often introduced in design and high art to direct attention to some particular passage in the composition; as the bright-eyed oxalis attracts attention by its sparkling white flowers, because of the contrast between them and the mossy carpet from which they spring.

The value of contrast in a social and a sanitary point of view shows how essential an element it is in the arrangements of this life. The monotony of *one thought* only, fastened upon the mind for weeks and months, has driven many a victim to the mad-house. If the respite which comes from a contrasting thought could have brought rest to the weary nerves, the catastrophe which befell the mind might have been averted. We know that the continual action of one set of nerves and one section of the brain will produce insanity. Variety and change are necessary to the health of the mind: therefore, there is the strongest reason for claiming the law of contrast as one of the primal principles of all art, which is made to give pleasure to the mind, and that this law affects all the elements of magnitude, form, position, direction, light, shade, color, shadow, and reflection.

UNITY.

IF we look at a series of designs or pictures, we shall probably discover that some of them affect the mind with a singleness of impression, as though the whole assemblage of elements in the picture or design conspired together to produce a single effect. This result is produced by the perfect subordination of all the parts and elements to the production of a united effect, in keeping with all the rules of composition which we have adduced from psychological laws. This result we call *unity* of effect. On the other hand, we will more frequently meet with those productions of the designer or artist which do not so affect us, but, on the contrary, seem to be telling us several different stories at one and the same time, — like several persons talking at once, each eager to be heard in spite of the others. This effect, of course, is distracting; and no work of art can be good which indulges itself in so many opposing impressions. All *great* works of art have a singleness of purpose and a singleness of effect which leaves us no choice but to admire them. They do not permit even a whisper to distract the mind of the observer from the grand *ensemble* of effect which they have to give. Neither the gambols nor the gymnastics of the painter in his effort at "*technique*," nor his own personality, are allowed to pro-

trude themselves. The painter is lost in his picture, as the man is lost sight of in his oration. This is one of the signs of greatness in art, and the art of design offers no exception to the rule. One of the most common errors in composition is in allowing some mass or group on the margin to attract and hold the attention, preventing the eye from resting quietly on the design as a whole. Thus centers of attraction, other than *the* center of attraction, are always destructive of *unity*. A single instance of this effect has been noticed under the head of Direction (see Fig. 8). In a large picture by one of our marine painters, exhibited a few years ago, there were represented upon the open sea two groups of vessels. One group was in the right half of the picture, and consisted of one or more large vessels and several smaller ones. The other group, numbering several vessels, was on the left side of the picture, a little farther away. There was a clear breadth of sky and water from the top to the bottom of the picture, over which one might draw the open hand without touching a single object. The effect of the picture was, that, as soon as the eye was fixed upon the group at the right, the group on the left attracted the attention by asserting its presence; and no sooner would the eye become fixed upon this, than the first group would again set up its claim to be seen and admired: and so the eye would be compelled to wander to and fro, finding no rest. There was only one way in which this picture might have been cured of its double purpose; and that would have been accomplished by drawing a knife from top to bottom through the canvas, and providing two frames instead of one.

A design should possess perfect unity of effect in order to be pleasing. The quality of *unity* gives rise to what is called "*breadth*" in painting; although the latter word has been much abused of late, by being made to do inappropriate work.

An absorbing interest in the central region of a design or picture concentrates the eye in that portion of the work, and subordinates the out-lying elements. Light always attracts the eye; and hence in pictures, the high light should always be found in the central and not in the marginal portions of the field. If it were placed in the margin, the eye would be attracted there; and the work would, for that reason, have a one-sided appearance: and a portion of the picture, remote from the center of light and attraction, would become useless, and might as well be cut away. Look at any number of good pictures, engravings, or paintings, and this truth will appear evident. In *design, marginal masses which attract the eye, centering the attention upon themselves, and preventing the quiet contemplation of the whole, destroy the unity of effect.* Hence marginal masses should always be subordinated to the central mass. This rule does not strictly apply to all-over patterns for wall-paper and carpets, where all parts of the surface are equally central, so far as the eye is concerned; and yet, in a measure, the *principle* applies there as well. But in the examples of elementary designs, filling certain geometrical spaces given in the illustrations, this rule applies literally.[1] By reference to the examples given, we shall see that the idea of subordinating all marginal masses to the central group is kept constantly in mind. This form of design is one of the most useful for beginners, as nearly all of the principles

[1] These designs are the work of pupils in the grammar schools, whose ages were about fifteen years; and they were made by them in the ordinary course of their work in drawing: they are placed here as examples of what pupils can do who are instructed in the principles as set forth in this work. The designs have not been changed in any essential particular, except that some of them have been reduced in size, in order to bring them within the compass of the pages of this book: otherwise they are as the pupils made them.

are applicable to them; and they can be easily applied in these limited spaces. In designs where all the parts radiate from the center of the space, the center should be made the most interesting and exciting to the eye: hence the forms should be more numerous, as they should be expressive of greater activity than elsewhere; and, if color is applied, the central group should be the most luminous, or certainly as luminous as the marginal.

With reference to p. 125, first and second figures, this concentration of attention is apparent (see p. 155). Observe the influence of the flowers in the margin in attracting the eye, although not to so great extent as to destroy the unity.

The effect of unity is one of the most important conditions of all æsthetic pleasure. The mind insists upon being undisturbed while yielding itself to æsthetic influence. It will not submit to opposing forces, and enjoy them, at the same time. One poem, one oration, one song, is enough for the instant: medleys are unartistic.

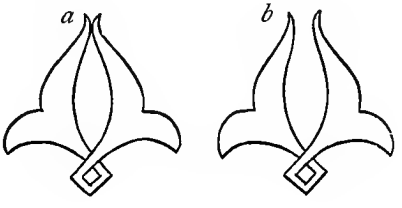
There is an application of this principle to wall and floor patterns which is important to notice here. In these the eye should be able to travel, so to speak, in any direction with equal ease, and should not be controlled in its movements by too obtrusive lines: especially it should not be compelled to move along one diagonal to the exclusion of all other directions. If the forms are made too prominent in contrast with the groundwork, the eye will be compelled to follow them whether so inclined or not. In the main, then, wall-papers and carpets should look like what they really are, flat surfaces; but we will notice some features of these designs more particularly when we come to the subject of "Application" of design.

There are two extremes which we wish to consider in this connec-

tion. These may be properly denominated *segregation* and *fusion* of parts. Segregation is that result of an arrangement which causes the elements to seem to separate into different masses, and to appear to become centers themselves: this effect destroys unity; as each group sets up an independent existence, and exerts an independent influence. What otherwise might be a community becomes a mob, where each is clamoring for the place of rule and honor. This inevitably happens where *parts* of a design, not centrally located, are so emphasized as to exert an independent influence. In this case the observer becomes a prey to party-strife, and in self-defense he must turn away to avoid its influence.

The effect of fusion occurs when the parts are so flat and uniform, and without emphasis, either in form or light or color, that they run together into one general mass. The fusion of two forms by coming in contact is another example of this effect. Two forms touching each other will afford a passage for the eye from one to the other, and their effects may be thus combined contrary to the intention of the designer. Thus it makes a very great difference in the effect whether the forms are open, as at *b*, Fig. 39, or closed, as at *a*, Fig. 39. In one case the surrounding space is let in to join the space within; and, by the union of the outer and inner spaces, the forms are separated: the eye is prevented from running over from one side to the other, as it easily does in the first example. In the second, the parts tend to assume an

Fig. 39.



independent existence: in the first, they are surely united in one single effect, because their extremities touch. Of course this effect is altogether independent of any volition on the part of the observer: it is wholly a mechanical effect, over which the mind has no control. In conformity with these principles we may adduce the following rules: —

Parts of design in the same geometrical space should be kept united into a single effect; and *contiguous forms in a design should not touch, unless they belong to the same unit. The elements of design should not touch the geometrical border.* From experience we can assure the teacher that these rules will be very serviceable. They hedge in the pupil from two prevailing errors in construction: at the same time they give the teacher the grounds for just and discriminating criticism. There are many examples of these errors in all classes where design is taught, but it is not pleasing to see them transferred as illustrations to the printed page. It is a good practice to collect such illustrations of errors in construction and composition, and keep them on file for use in lectures on the principles of design before the class. The author is aware that it would have been useful to insert in these pages such a collection as he has made, showing errors of construction, as illustrating directly the meaning of the text: but forms once printed in a book become too permanent if they are not good, and vitiate the taste by their presence; while they become an offense to the cultured eye. It is hoped that the principles are so clearly stated that they can be fully understood without such aids.

DIVERSITY IN UNITY.

THE demand of the mind for a unity of effect, as shown above, is in no way contradictory to another equally imperative; and that is, the need for diversity we have already indicated. This law has reference to magnitudes, forms, positions, directions, etc. Let us now recognize the fact, and set down the law of the mind in this respect, *That diversity, in a broad and general sense, must prevail, co-ordinated with unity.* This is one of the chief sources of pleasure in beholding a work of art, whether it be a beautiful design or a charming picture. Diversity alone is chaos. Diversity subordinated into unity is *community* and exquisite order. Diversity alone is a mob: with unity it is a well-regulated society, in which there is peace and happiness and liberty. It is the association of ideas suggested by the beautiful design which gives the mind its chief pleasure. We read in the lines of ornament the record of our thoughts.

The "Slave-Ship," by Turner, is an example of the perfect subordination of diverse elements into a unity of effect, — a single grand impression of the power of the great sea under the influence of the mighty storm. The ocean is stirred to its deep floor as the raging storm passes away. Vapors ascend from the surging waters in sweep-

ing, vertical curves, mingling sea and sky in one; and in the distance, against the dark mass of the retreating storm, is faintly seen the masts of the sinking "Slave-Ship," utterly insignificant amid the grand fury of the elements. Shattered sunbeams struggle through clouds on mists and waves, and reveal to us glimpses of the monsters of the deep, and hints of the victims from the sinking wreck. It is a scene of *action* and *power* and motion; and the sea, the storm, the sun, the sky, the thing of abhorrence, — the slave-ship, — are the elements brought into one grand unity and climax of effect. There is, indeed, in this picture a "purgation of superfluities."

It may be remarked, that, in this picture, lines which express grace, motion, and power are most predominant: this expression of these characteristics is most remarkable, and few works express them in equal degree.

We have noted many of the various ideas, feelings, and sentiments which may be expressed by the elements and combinations in design. It will be seen, that the pleasure we receive from a design depends mainly upon the number, variety, and intensity of these impressions. It would seem to be self-evident, that to fully comprehend these conditions and sources of our pleasure, and the methods by which these effects might be secured, would enable the pupil, not only to produce beautiful designs at will, but also to define precisely the principles of construction upon which such effects depend. Thus the critic and designer would acquire a simultaneous being.

The foregoing analysis of the sources of our pleasure in the art of design enables us to appreciate the difficulties of the subject, and to apply our energies to the proper points of attack, and not to waste our time upon ineffectual methods.

We may venture to say, that there is no possible way of comprehending the subject except by an examination of the sources of our pleasure, and the conditions upon which they depend. And, when we have determined these sources and conditions, we shall find that they apply universally to all art as well as to decorative design.

These conditions of art, which are found to be responsive to our minds, are expressive of a life and energy which is within ourselves; and thus the highest art is that which is most expressive of our own mind and life. Under this law, then, all good art is an outgrowth from our own minds; and we find its highest type when it reflects our own mental constitution.

If any one would find beauty and grace, let him look within; and, if he does not find them there, he scarcely needs to look elsewhere: and thus it is that the law of all art and the conditions of its action are found in the human mind. Again, while the fundamental principles of design become the reflection of our mental life, they also conform to the law of life which exists in the forms suggested in the elements used. That is to say, in introducing plant-forms into design, we do no violence to the law of life, energy, and growth which exists in them: but, rather, we endeavor to enhance that expression of life; and hence we choose those forms which are most expressive of their characteristic energies. We come in this way to reject all forms assumed by plants under the influence of failing energy or decay. Thus, we would reject the forms which plants take in the process of wilting or dying. We should use those forms only which are expressive of the fullest and most intense life, that every line may be expressive of power as well as of grace and beauty. In fact, beauty itself is partly dependent upon this quality of power. Rampant life takes the form of beauty,

but all beauty is lost in decay. The expression of all good ornament derives its main force from this source: the living forms are addressed to the mind, and they find a responsive echo therein.

Look at any style of classic ornament, such as the Greek or Moorish, and every form and line will give you the impression of an unrestrained living force.

CONSTRUCTION.

THE elements of design, if they are natural forms, should be arranged in accordance with the laws of composition already indicated; following the natural order of growth as to the sequence of leaves, buds, flowers, and fruit, with such modification of the accidental forms assumed by nature as the laws of graceful composition demand. And, however near to nature the forms selected may be, the order of arrangement must be more or less conventional; and thus the forms may be natural and the arrangement conventional, or both the forms and the arrangement may be conventional.

Where both form and arrangement are natural, the representation passes from the province of design proper to the pictorial, and should be treated and judged as a picture, according to the rules of pictorial representation.

But, so far as public-school work is concerned, perfectly natural forms should not be used in design.

It may be desirable, however, to have the pupils make pictorial representations of plants with buds and flowers, in connection with their lessons in object-drawing, for the purpose of securing the elements for design.

Plant-forms should be made to fill any geometrical space by a system of radiation from some point or line. *All parts of the design in the same geometrical space should be joined, or have the appearance of being joined, into one system of growth* (see Fig. 39, the example of Moorish ornament).

Geometrical spaces may be of any desired form, to suit various places and uses.

In designing a simple passage, like a spray, the grouping should be such as to bring those forms uppermost which naturally belong there in the order of growth; the older and more mature leaves spreading out lower down near the base of a spray, and the more recent buds and flowers at the top, or wherever they would naturally occur in the particular plant used: and, if fruit should be represented, the bending stem should indicate weight, if the habit of the plant is to bear heavy fruit; and all other such appropriate signs of natural qualities should be carefully wrought into the composition.

In general, all beautiful lines and forms of the plant selected should be used in the design.

If the plant used has ungraceful lines, they may be fashioned into grace and beauty by the designer.

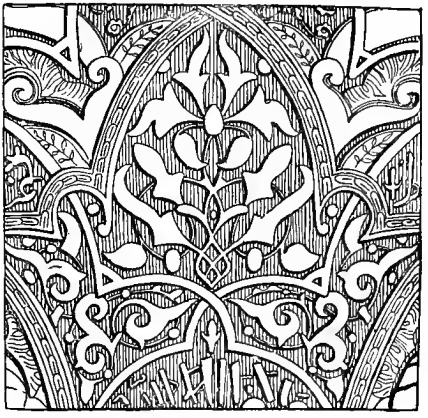
The designer should consider himself above the materials which he uses, molding them into pleasing forms. In this he shows the superiority of his mind.

He is not bound to be faithful to the minute particulars of botanic life, because he and his work are superior to the mere *imitation* of plant-forms.

He selects a plant for his design which is suited by its habits to fill the place and answer the use in view. Some plants are suited

to borders or continuous representation, because of their long stems. It would be evidently absurd to employ the apple-blossom and leaf, flowing in vine-like arrangements; but the grape, clematis, hop, ampelopsis, passion-flower, and such plants, are suitable to this class of representation. The blackberry may be so used to a very limited degree. For single radiate masses, the strawberry, oxalis, cyclamen, and the like, may be appropriately used; and, in fact, almost any plants will answer for this limited purpose; while there should be an appropriate selection for the larger combinations, where vines are used.

Fig. 40.



Forms wholly or mainly fantastic, having little or very distant resemblance to plants, are appropriate for design when they are made to express all the ideas of beauty and rhythm which the mind expects in a design. Such fantastic elements the designer may use with freedom, and do no violence to the laws of the true ideal. He may, in fact, express with them all the fullness of idea and sentiment which we have noted as being the chief aim of design. In the Moorish ornament the forms were quite remote from any real plant-forms; still, they possess all the grace of flowing line, and beauty of variable form and size, which belong to real plants. The Moors were prohibited by their religion from the direct imitation of any living thing

in their ornamentation: hence they employed wholly conventional forms. The employment of forms, therefore, which are quite remote from real plants, is not only admissible, but often desirable; the only condition being, that they must be expressive of the ideas above enumerated as essential to all design.

The first step in the construction of a design is, to lay out accurately, with rule and compasses, the geometrical space to be filled. This space may be cut up into halves, quarters, eighths, etc., or thirds and sixths, etc., according to the form of the space employed. Let us suppose the space selected is a square, accurately drawn with rule and dividers: the diameters and diagonals should then be drawn. Then select for the unit of space either a quarter lying between two adjacent diameters or between two adjacent diagonals. Then the pupil should proceed to fill this quarter-space with a suitable design, satisfying all the requirements. This quarter we will call the unit of space, and the design that fills it is the unit of design. To repeat accurately the unit of design in the remaining three units of space, a tracing of the unit should be made on thin tracing-paper; taking care to mark the angles of the unit of space by dots in such a way, that, when the tracing-paper is placed over the next unit of space, the dots may be accurately placed over the corresponding angles. The tracing-paper should be nearly transparent, so that the lines of the drawing may be readily seen through it. To make the tracing, mark on the tracing-paper firmly, with a good pointed pencil, over each line of the drawing. The trace may then be turned over, and marked on the under side against each line traced on the face, so that the line of the drawing will be on both sides of the tracing-paper. Then the other spaces may be filled, by tracing over each line of the unit of design in each

unit of space. The process is easily accomplished by pressing firmly, while drawing the pencil-point over each line on the trace; thereby transferring, in faint lines, the design to its proper place. The lines can then be drawn in with a firm hand. The process may be repeated until all the units of space are filled.

In large or elaborate designs, it is very difficult and tiresome for pupils to hold the tracing-paper on the design, without moving it, long enough to make or transfer the trace. The process may be made easier by fixing slightly the edges of the tracing-paper with mucilage.

APPLICATION OF DESIGN.

THE uses of design are too varied to be enumerated in full in this place; but we may notice some of the most ordinary applications of design, for the purpose of pointing out some of the necessary conditions of such applications.

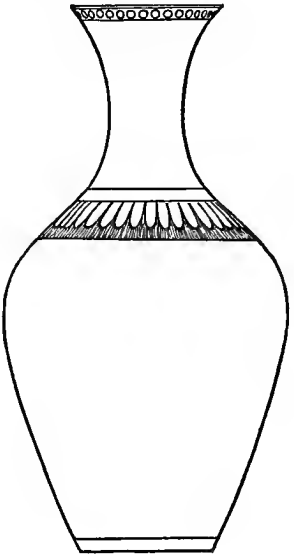
Pottery is one of the most abundantly ornamented products of human industry; and the application of design to objects of this sort is determined by so great a diversity of tastes, and the styles of ornament are so various, that there is a wide range in which thought and fancy may find ample play. It seems only necessary to point out some general principles which may be useful to the teacher in our schools. Designs of this class are of all degrees and characters, from the painted landscape to flowers and animals of all grades; the human face and figure, in color or in relief; carved ornaments of all kinds, with or without color: in fact, the range is limited only by the powers of execution and by the highest conception of art.

The teacher of elementary design will find, however, that the decoration of the simple forms of familiar objects will be among the most pleasing subjects upon which to engage the attention of her pupils. An application of the suggestions heretofore given will enable the teacher to assist the pupils in producing very pleasing designs;

and if, in addition to the designing of the forms themselves and the ornament to be applied to them, there could be added, under certain favorable circumstances, the actual painting or carving upon the objects themselves of the designs prepared, no better or more interesting application of the skill and taste acquired could be found.

The pupil may begin with a single vase, and devise some style of decoration. It is, of course, better to avoid the selection of naturalistic forms at first; because, in most cases, the pupil could make but an indifferent picture, while he might very readily manage conventional and set forms. These may take the shape of horizontal bands of various widths at different positions on the vase. There are, undoubtedly, right and wrong places for bands of ornament. Evidently, a band of ornament should not be placed half-way between the top and bottom of the vase, nor quarter-way, nor in the middle of either the neck or body, for reasons already pointed out on p. 71. It is quite obvious, too, that the ornamental stripes should not run from top to bottom; because it would destroy all idea of the general form, and would not produce a feeling of repose and unity. If the object is to be ornamented with bands dividing different ground-colors, or parts of the ground of the same color, the main band of ornament may properly occupy the position indicated

Fig. 41.



in Fig. 41. The width should be adapted to the size of the vase. Any division of the body of the vase by bands would seem to be objectionable, because it would interfere with its character as a vase; but if there were to be more pictorial features added, such as a medallion, or a spray of flowers, or a landscape, this broad central space offers itself kindly and gracefully to such use; or if only broad masses, of rich color, were used for the ground, the body of the vase and the neck are the appropriate places for it. For like reasons the neck of the vase should not be cut up by a succession of horizontal bands, like one wearing a succession of collars.

Fig. 42.

The bands used may be compound or simple. If composed of several bands, the widths should not be the same, nor easy divisions of the same; except that the bands on each side of a central band may be of the same width, inasmuch as they are accounted symmetrical in a certain sense. If high lights and low shades are employed, it is evident that the high lights should not occur on the top and bottom of the vase, and darker shades on the central space, but rather that the central mass should receive the high light: thus the eye would be directed to the central mass. For a similar reason, the most elaborate ornament should occur near the central portion of the vase; and the upper and lower portions should be simply subordinate parts, assisting in the general effect, but not constituting the chief points of interest. This is necessary to the principles of unity and repose. These suggestions will apply to any and all forms of ornament applied to these

objects. A style of high relief, not in keeping with the idea of use, is frequently employed on these forms; which, however beautiful it may be, the beauty of use is not one of its characteristics: and, consequently, such forms are necessarily placed with the class of ornaments unsuitable for use, such as pictures and statuary; but, belonging to this class of objects, the standard of excellency is necessarily raised.

With reference to the use of real pictures of birds, beasts, fishes, landscapes, and human figures in the decoration of dinner-services, there seems to be an evident impropriety in roast meats and gravies swimming over a sunset sky, or jams and ices floating over either a fisherman's hut, or a thicket where unsuspecting quail are feeding. Such have the sanction of use in high quarters, though the want of great wealth will prevent the mass of the people from indulging in such questionable taste.

FLOOR-COVERINGS.

THE style of carpeting, since 1876, has shown a very marked change in the direction of better taste. Before that period, the great panel-patterns and landscape-designs, and patterns made of immense running vines and flowers, were very common, and even now are sometimes seen; but a better taste prevails, and there are signs of constant improvement.

Designs for floor-coverings should certainly possess a few unmistakable qualities. First, the pattern should appear to be *flat* or *level* as the floor; and it should seem to be the most appropriate thing in the world to walk upon. The carpet should invite the guest, by its suggestive appropriateness, to try its soft surface; as a mossy bank invites us, by its smoothness and softness, to sit or walk upon it; or as the rich brown carpeting under the white-pines, in summer or autumn, allures us to tread upon its soft, clean surface. This is Nature's method of carpeting her halls of state under the spreading trees.

It is evident, that any style which destroys the idea of smoothness, flatness, and softness is not good. We not unfrequently see landscape-patterns in carpets, the view covering the whole floor. One which I remember may be taken as a type of its class. It represented a kind of park, in which there were a bridge of stone with balustrade

and stairways, water reflecting the blue of the sky, huge trees and tangled shrubs, flowers and flower-pots, swans and boats, and children at play. The occupants of the room would be expected to sit with their feet on the blue water, even in the cold days of winter, tread upon the boats, swans, and children at play, and walk over the trees, shrubs, and stone bridge. If there are any rules of propriety and good taste concerning the style of floor-coverings, this carpet must certainly violate them all. Such patterns or pictures do not belong on the floors, but on the walls. They may be great triumphs of mechanical skill, — being actually produced by machinery, — and they may be costly; but these facts are not valid reasons for regarding them as suitable for floor-coverings.

It is evident, that there should be no *up* or *down* end to a carpet, as in a landscape; because it must, in that case, be often viewed in an inverted position. One may be sitting on the sky-side, and view the inverted pond and garden. It is evident, also, that certain colors are more appropriate to carpeting than certain other colors: thus the approaching colors, such as the earthy browns, yellows, reds, and greens, are more suitable to the floor than sky-blue, which is cold and retreating. It does not meet the mind with the proper suggestiveness of substance. If blue is employed at all, it should be only in minute spaces; as nature employs it in the color of a flower. Small patterns without apparent relief, and without a top or bottom, or right and left construction, are most appropriate. The prevailing effect of color should be that of solidity and shade, and not that of vacuity and light.

The furniture and occupants of a room should seem to have something substantial and secure to stand upon, and should not seem suspended in mid-air. Within these general limits, there is room for the play of a great variety of tastes.

WALL-PAPERS.

A FEW considerations, with reference to wall-papers, may help the student of domestic art to treat the decoration of walls with modesty and taste. In the first place, a wall should appear to be a vertical, continuous surface, as it really is: therefore all ornament should be applied without disturbing these facts. All forms tending mainly on one diagonal or the other should be rejected, as should all methods of cutting up the space by dado and bands which differ so widely from each other in color or light and shade as to fall away from each other, and become separate. In other words, unity of effect should be secured.

There are two general divisions of wall-ornament, to be made and considered apart. One is, where the decoration of the wall itself is the thing to be viewed; and the other is, where the wall is simply prepared suitably to receive other decorations, such as pictures and statuary. The first class may be treated in any pictorial style, from the best of Italian frescos to common wall-decoration, with natural objects done in light and shade, with or without color. The frescos of the Capitol at Washington by the Italian painter, Constantino Brumidi, are examples of this class of work. No pictures or other ornaments are to be hung on walls treated in this way. There may

be many grades of wall-decoration in this class, which are supposed to be sufficiently ornamental of themselves. The second class of wall-decoration is a treatment of the wall-surface so that it becomes subordinated to other ornaments upon it. In this case the wall should be treated as entirely secondary to the pictures or statuary which are to appear against it. Wall-papers are usually employed and should be designed to fill this primary class, according to distinctions above indicated.

The treatment of wall-papers must be governed by the same general principles which rule other designs. The general effect must be considered with reference to the style and color of floor-coverings, ceiling, furniture, etc. The room must be taken as a whole, and considered in the *ensemble*, with the furniture as a factor in the sum-total of effect. Many rooms appear to present incongruities on account of their numerous conflicting, and even warring, elements; distracting the attention, and disturbing the repose which all should feel on entering a well-furnished room. One of the most fertile sources of this inharmony is the wall-papers. These are selected, it would seem, without any reference whatever to the requirements of the other appointments of the room. The first thing to be determined in the selection of wall-paper should be its color and its degree of light. If pictures are to be hung upon the wall, the color and shade of the wall should assist the eye to see the pictures, and not hinder it. The paper may do either. If the wall-paper is very light, or has luminous masses in it which are brighter than the high light in the picture, the eye will be attracted to the highest light, and consequently *away* from the picture to the wall. This effect is inevitable. If, on the contrary, wall-papers are of a low shade, and not exciting in color, the eye will gravitate directly to the pictures, and

will rest upon them easily. The wall-paper will mind its own business, and not disturb visitors who wish to look at the pictures. To secure this result, a small figure and a low tone of color may always be safely used. Care should be taken not to employ a color which is too receding or distant, like some shades of blue; or the walls may have the effect of receding too much, and cause all subordinate objects to appear to be detached from them: neither should a decidedly approaching color be used, such as yellow; because the opposite effect would be produced. In these respects the colors used should be medium, and they should be medium also as to light and shade. As regards the style of pattern used, it is of but little consequence, provided the conditions above noted are complied with: only, it is very evident that large, staring figures are objectionable; the more quiet and inoffensive the better. With reference to shade, it would appear certain that there should be some proper scale of shade running through the surfaces of a room; namely, the floor, the wall, and the ceiling. It would seem the most natural that the floor should be the least luminous, the dado the next highest in the scale of light, and the wall next, and the ceiling lightest of all. Or the dado may have the same degree of light as the floor, and then the wall and ceiling lighter in due proportion.

There can be no doubt that the ceiling should, on the whole, be the most luminous; and more receding colors are appropriate here, especially if the walls are not high.

The harmony of all these is the most essential quality. Where perfect harmony and fitness prevail between the floor, the wall, ceiling, pictures, statuary, and furniture, a feeling of repose and quiet ensues, which is not without its immediate effect upon the minds of the guests or inmates of the room.

There are two necessary conditions as to the color and light and shade of the figure of the wall-paper in comparison with the ground or body of the paper, as to which should be the lighter, and which should be treated with the more approaching color. It may be observed, that if the figure is darker than the ground-color, and if the ground-color is more retreating than the figure, the latter will appear to separate from the ground, and produce something of the effect of looking through a vine-clad trellis through which the light of the open sky is seen. This effect, of course, destroys the harmony and repose of the room; as it destroys the sense of solidity and security in the walls. It is preferable to have the ornament lighter than the ground on which it is drawn, in order that the figure may be the first to catch the eye, and not the interstitial spaces.

With regard to the approaching qualities of the colors used on the two spaces, the figure should be the more approaching, and representative of more substance. Spotty effects should certainly be avoided: whether produced by bright-red masses, or yellow or white, the effect is equally bad. All numerical effects should be avoided. Let no one be tempted to count the spots or squares, because of their prominence: this effect, so often seen, is destructive of all repose and unity. Nothing on the whole surface of wall-paper should exert an independent influence, and assert an independent existence. There should be an effect of *flatness* or breadth throughout the whole.

These qualities apply equally well to floor-coverings; although more decided figures are possible in the carpet than in walls, because the walls are but the background for other objects.

Borders should be in keeping with the character of the wall-paper, both as regards color and light. They should not be so much darker

as to appear as a dark rim or frame in which the walls are set, but rather as a shaded portion of the same walls. The width of borders should, of course, be proportional to the height of the room.

In the decorations of a room, the mantel-piece and fireplace play an important part. Of course, a white marble mantel-piece is not in keeping with any thing; as its light is higher than either carpet or wall. The mantels should be of wood, like all other trimmings of the room.

It is a sign of real progress in the art of household decoration, that the *fireplace* is again coming into use. What is there more congenial to one's feelings than the glow of the open fire, and especially if it is a wood-fire. It is unequaled as an adornment of the sitting-room or parlor. The odor of the wood is diffused through the room. The beech, the oak, the maple, the pine, and the birch and hickory, each has its peculiar odor when burning: flames of yellow, red, purple, and blue, running into threads of woolly smoke and steam here and there; the thousand sounds of the flames, flickering, hissing, and snapping and crackling, — all these are entertaining, and conduce to quiet repose and reverie. The return of the fireplace to our homes is a sign of a return to good taste, from which we seem to have altogether departed.

HINTS TO TEACHERS.

NO department of drawing taught in the public schools is more important or profitable than design. Pupils will draw better when working out their own designs than when they are only copying. The consciousness of *ownership* is an important factor in the motive for improvement; and the thought that the pupil has made, by his own will and knowledge, an original design, and that he knows precisely how to make another, equally good, or better, gives a feeling of greater worth, and elevation of character. This, of itself, is an important gain in an educational point of view. It has been before remarked, that the principles of design are the underlying principles of all art, and consequently of good taste as well. It is for this reason that the study of design, taught in a proper and thorough manner, would conduce very much to the good taste of the future community, and would effect all subsequent interest and actions of the pupils thus taught.

It is important, in teaching design, that the teacher should begin with the combination of the simplest elements, and should note every thought or idea expressed by such combinations. It is not difficult to lead the pupils to apprehend these various expressions, and to grasp the laws of combination upon which all design is based. This has

been found to be the case where the subject has been intelligently taught.

The teacher should direct the pupils as to the geometrical space to be filled, or the style of the design to be made, and consult with the pupil as to what elements should be used: or if it is to be applied to some object, as a vase, the *method* of ornamentation should be discussed.

It is always better to have the whole class at work on the same geometrical space, or ornamenting or designing the same object, so that the instruction that is suitable to one will be suitable to all. The teacher of design must confine the pupils to simple combinations until they have acquired some idea of the laws of arrangement.

There will, as a matter of course, be much rudeness and coarseness, and many incongruities, in their first efforts; but when one of these errors has been once pointed out, and the reason of the error made plain, the pupils are pretty sure to avoid that error ever after.

The commission of errors in design should be no discouragement to the teacher. They are but the stepping-stones to improvement, and afford the teacher an opportunity to set forth clearly the principle which has been violated in the construction or application. Let the whole class take up the same subject, and make their design on a piece of exercise-paper, either brown or white: a smooth manila paper is suitable, and quite good enough for this purpose. The first plan or scheme of the design may be done at home, or in the schoolroom, according as the time of the pupils is occupied by other studies.

The teacher should criticise the work of the pupils before the whole class. Where there is a community of interest, there should be a community of instruction, that all may have the benefit of the criticism due to each.

These designs should be brought in and collected; and the teacher should stand before the class, and go through all of them, pointing out to the whole class the errors in each. After being criticised, they should be returned to the pupils for the necessary corrections. It is not advisable that the pupil should make the whole design before submitting it to the teacher. A single unit of space is often sufficient for the purposes of criticism.

It is better not to have the pupil do more work than is needful, when, perhaps, the whole design may be rejected.

The teacher must not be troubled about the idea of originality in the first efforts in design. There is a semblance of truth in the saying, "There is nothing new under the sun," except in *adaptation* and *arrangement.* The subject should be treated precisely as the first efforts at composition in language: in either case the teacher should suggest corrections where errors occur. It is not always needful that the teacher should suggest the precise change to be made, but only to point out the principle violated, and the direction the change should take in order to get rid of the objectionable quality.

METHODS OF CRITICISM.

WHAT QUESTIONS MAY BE ASKED AND WHAT QUALITIES CONSIDERED.

THE teacher should inquire with reference to any design, —

First, *Is the space well filled?*

The space should be *so* filled as to present no appearance of barrenness or sparseness on the one hand, or excessive fullness on the other. A mob of elements crowded together is as bad as a desert space.

More or less fullness may be given to a design, according to its use, and whether it is to be seen from a distance or near at hand; and this quality is also dependent upon the kind of material to which it is to be adapted, and whether large or small.

With regard to the quality of fullness, the design must give the proper impression.

Second, *Are the forms used beautiful in themselves, and expressive of life and energy?*

Third, *Are the elements used, taken as a whole, too large or too small for the use made of them?*

If they are too small, and the space is well filled, there will be an effect of great number, giving the disagreeable impression of multitude.

On the other hand, if the forms used are too large, they will have the effect of wanting room, and will appear monstrous or over-grown.

Fourth, *Are the elements properly arranged as to magnitudes?*

This principle has been fully discussed; and, as it is one of the first principles of design, great care should be taken to adjust the relative magnitudes.

Fifth, *Are the forms used harmonious?*

Sixth, *Is the law of position and direction duly observed?*

Seventh, *Is the law of alternation properly expressed as regards magnitude, form, position, and direction?*

Eighth, *Is the law of direction of lines and forms such as give the best expression and the most pleasing effect?*

Ninth, *Are the forms symmetrically arranged where symmetry is intended or desired?*

Tenth, *Have all obtrusive lines and forms been subordinated and subdued?*

Eleventh, *Has unity of effect been preserved throughout, by subduing all subordinate masses, and grading them to one general effect?*

Twelfth, *Has the principle of radiation been duly expressed, as showing the origin of the several parts?*

Thirteenth, *Has the law of tangential union of lines and stems been duly observed in the construction of elements?*

Fourteenth, *Has the natural order of growth and the natural disposition of the plant used been observed?*

Fifteenth, *Do the elements in the same undivided geometrical space appear to be attached and naturally connected?*

Sixteenth, *Are there any unmeaning lines or forms used?*

Seventeenth, *Is the design made from the elements of one plant only?*

Eighteenth, *Is the general effect of the design one of richness, life, elegance, and beauty?*

If any elements, or combination of elements, tend to mar the general effect, they should be modified. All designs should look rich, costly, precious, *beautiful.*

Nineteenth, *Is the execution refined and vigorous, giving clear-cut forms, clear lines, etc.?*

Twentieth, *Is the quality of the design such as to require half-tint or a shaded background?*

Half-tint should be applied to the ground whenever the forms are so numerous as to appear a little too crowded. The effect of half-tint on the ground is to destroy the individuality of the interstitial spaces, and thus reduce the number of forms apparent to the eye.

These questions, with others which will suggest themselves, will help the teacher to acquire a ready habit of criticism based upon just and rational principles.

It is better that these questions should be put to the class, or to the particular pupil, than that they should be answered without asking by the teacher.

Let all of the qualities which are appropriate and important in design be the subject of inquiry and discussion. The pupils will soon discover that they can understand design as well as any thing else, and, with an understanding of the principles, will come to have an added power of invention, combination, and execution.

In the classes of the grammar-schools, the pupils should confine their attention to elementary design until they have mastered the chief difficulties; and then it is proper to turn their attention to applied design. For the purposes of elementary design, there are a great

variety of geometrical spaces, which may be filled with suitable ornament, such as triangles, squares, pentagons, hexagons, and other polygons, circles, ellipses, spherical triangles, rectangles, parallelograms, etc., and innumerable figures which may be devised, or are in use, as spandrels, corner-pieces, panels, center-pieces, etc. These, with an endless variety of borders and bands of ornament, with all-over patterns, or repetition on vertical and horizontal or on diagonal lines, will afford sufficient variety for practice. The forms of arrangement may be radial from a center, or springing from a central line in the form of a sprig or spray, or from a continuous line, as in Roman scroll-work. When these forms of design become easy and familiar, the pupil should take up applied design; that is, some object should be drawn, and the ornament for it designed. Vases, goblets, tumblers, gold and silver ware, such as gold or silver table-services, water-pitchers, crockery or porcelain table-ware, tea-sets, tiles, and fire-service generally, lace-work and embroidery, wall-paper and carpetings, designs for stone-cutting, wood-carving, and iron work, — any of these subjects are suitable for advanced work in applied design. For a first effort let the pupils take a vase, either designing one, or taking an old form, and designing the ornament for it; placing the bands (if there are to be any) in their proper places, with their due proportions as to widths and size of elements used. In the same way let the pupil design a cup and saucer, and the enrichment for the same.

As to lace and linen patterns, the design may be made in the ordinary way, and then painted in pure white or black upon a piece of transparent tracing-paper, laid over and fastened upon the design previously drawn upon white drawing-paper. This painting should be done with "water-color," and, when completed, can be removed from

the drawing itself, and mounted on either white or black paper, whichever serves the purpose of showing the design to the best advantage.

In advanced work, water-color may be used for coloring the designs. For this purpose the colors should be mixed with white, to make them opaque.

The application of color to design brings in another important element, which must be studied with reference to the harmonies of color and contrast. These principles are not difficult of apprehension; but they require a little close attention to a few purely scientific facts, and these have been furnished us by a few sagacious scientists.

COLOR.

COLOR, as applied to design, becomes a subject of the first importance to understand with reference to the effects produced upon the eye and the mind: here, too, we must study the laws of the nerves which are to be affected. It is to be presumed, that, where colors are used at all, they are used in combination. If there is any law of combination which dominates here, it is important that the designer should comprehend and apply it. If there were no laws, the designer could color at will. As it is, however, the laws of nervous action determine for him beforehand what he shall do, and prohibit him from doing what he should not. This law of nervous action has been before alluded to on p. 64, as an indication of certain necessary conditions of pleasurable action of the nerves of the eye when viewing color. The law of pleasurable action seems to be, that the eye should not be fatigued by the preponderance of any one color; that is to say, that the combined effect of all the colors in a design should be neutral or gray. In that case every color will have its own complementary or harmonizing color present; and, while the eye is agreeably exercised by the different colors, it will not be fatigued by any one of them.

Colors are said to be complementary when, by their union, white light is produced.

Without going into the philosophy of color very extensively, which the plan of this work does not invite, I may refer the reader to the very excellent work by M. Chevreul,[1] of which there is a good English translation; and I will quote a few appropriate remarks from a very entertaining work entitled "Æsthetics," by Eugène Vernon, from whose work I have also borrowed the table of Helmholtz. He says, —

"Until quite recent times, painters in search of harmony were compelled to depend either on experiments or personal experience. In 1812, for the first time, Charles Bourgeois, having made a study of the phenomena, gave an explanation to the world; which has since been taken up and completed by M. Chevreul, in his book upon the laws which govern simultaneous contrasts of color.

"We will endeavor to present it in a few words: The prism decomposes the white light of the sun into six colors, — yellow, red, blue, violet, green, and orange. The three first are called primitive colors, because it is impossible to obtain any one of them by any mixture whatever. The three last are called composite or secondary; because violet can be produced by red and blue, green by yellow and blue, and orange by red and yellow. In the intervals between these colors come the infinite series of intermediary shades.

"The following table, arranged by M. Helmholtz, gives the results of the various mixtures of the prismatic colors. The colors used in combination will be found in the first vertical column and in the first horizontal one; the color at the intersection being the result of the mixture in each case, as in the table of Pythagoras.

[1] De la Loi du Contraste simultané des Couleurs et de ses Applications.

Fig. 43.

	Violet.	Indigo.	Pure Blue (*Cyanique*).	Greenish Blue.	Green.	Yellow-Green.	Yellow.
Red.	Purple.	Dark Rose.	Whitish Rose.	White.	Whitish Yellow.	Golden Yellow.	Orange.
Orange.	Dark Rose.	Whitish Rose.	White.	Whitish Yellow.	Yellow.	Yellow.	
Yellow.	Whitish Rose.	White.	Whitish Green.	Whitish Green.	Yellow-Green.		
Yellow-Green.	White.	Whitish Green.	Green.				
Green.	Whitish Blue.	Blue of Water, or Sky-Blue.	Greenish Blue.				
Greenish Blue.	Blue of Water, or Sky-Blue.	Blue of Water, or Sky-Blue.					
Pure Blue (*Cyanique*).	Indigo.						

"By the table we see that the complementary colors, that is, those which, when united, produce white, are, *first*, red and greenish blue; *second*, orange and pure blue; *third*, yellow and indigo; *fourth*, yellow-green and violet. Prismatic green has no simple complementary: its complementary is purple, a compound of red and violet.

"But these theories are of little use to painters as aids to the preparation of tints, because the colored powders which they employ are unfitted for their application. They are, however, a great help to the comprehension of the effects resulting from the juxtaposition of different colors. Whenever complementary colors are placed side by side, they enhance each other's brilliancy. Yellow-green attains its maximum of intensity when placed next violet, orange when bounded by pure blue, yellow when bounded by indigo: moreover, violet appears more violet, and blue more blue, when in immediate contact with yellow and orange.

"For a similar reason, when non-complementary colors are brought together, they diminish each other's beauty and effect. Too lively a red is lowered by the neighborhood of blue. Violet in contact with yellow becomes almost rose."

It is to be remembered, that the mixtures referred to in the table of Helmholtz are not those of pigments, but of different-colored lights; and, while it will afford no clew to the mixing of powdered pigments for the production of the various colors, it is valuable as showing what colors are complementary, and, consequently, which will enhance the value of the other when brought into juxtaposition. The theory of complementary colors is the key to all successful application of color to design or painting. Colors will make war upon each other, and upon the nerves, unless they are harmonized. The general effect of a well-

painted picture is, to leave the mind free from the effect of any one color. In fact, we should not be compelled to think of color at all, but rather of the picture as a whole: frequently, however, the color becomes a real offense; because it is unmated, or unbalanced by its harmonizing complement.

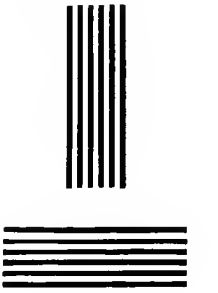
There are several other effects of color which are important to notice here.

OTHER QUALITIES OF COLOR.

Colors are either *warm* or *cold* or neutral, retreating or approaching or neutral, opaque or transparent or neutral. Warm colors are those which suggest heat, as orange, yellow, red, and the browns which approach these. Cold colors are the blues, purples, and grays approaching these colors.

The quality of approaching or receding is a curious quality of color, and enables the painter or designer to cause some objects to appear to be nearer than others. To fully appreciate this quality, let the pupil paint alternate stripes of orange and pure blue, or yellow and indigo, as indicated at Fig. 44, and then view the stripes through a single magnifying-glass. The different colors will have the effect of raising the yellow or orange stripes above the blue; that is, the blue stripes will appear depressed, and the orange stripes raised. Take three colors in the same way, observing the effect, using red, yellow, and blue. Try another series of two colors, using red and greenish blue.

Fig. 44.



In design, this quality of color enables the draughtsman to bring out the forms of ornament against the background of color. The ornament should be approaching in effect, and the ground retreating. As there are various degrees of this quality, any desired effect can be obtained by using the proper colors.

Opacity and transparency are other qualities of color which have an important influence in determining the fitness of any scheme of coloring. Opacity stops the eye; that is, the sight does not penetrate the object. Opacity does not mean density: it is only the appearance of density. It has, consequently, the appearance of substance. Forms of ornament, if desired to appear substantial, should be painted in opaque, and not in transparent, colors.

The pupil will have to learn all these various and variable qualities of color by use and experiment. It is not intended here to give an elaborate analysis of the subject of color, but only to direct the attention of the pupil to certain fundamental principles which are indispensable, and to suggest suitable topics for his investigation.

There are numerous works on color which are more or less reliable as they conform to or depart from the demonstrated scientific facts already established by the scientists. Every student of color should be cautious not to give mental assent to all the theories of harmonizing colors received with confidence before the science of color had been so far advanced.

PLANT-FORMS.

A series of plant-forms is added to the list of illustrations to this volume, in order to afford ample material for design, both as regards

the number and variety of character of the plants given. In most cases these have been drawn direct from the plants themselves, and for that reason are not without a certain botanical interest over and above their use as elements of design. The natural forms of the plants are given, and, in addition, a front and side view of the flowers, and the full form of leaf, and such other elements as are useful in design.

Where the front and side views of flowers are omitted, they are usually found in the natural view or picture of the plant. These forms may be more or less altered to suit the purposes of the designer. They should never be traced from the book, and transferred to the design itself. They should be *redrawn* at will, and without a close fidelity to the individual plant, but freely and broadly. The designer is superior to his implements, — the elements with which he deals; and they should be like clay in his hands, plastic to his will, that they may serve his purpose.

CONCLUSION.

We have endeavored to present the subject of design in its dependence upon certain fixed laws which govern the mind with reference to its inevitable action in the contemplation of the beautiful. It is believed, that a thorough study of these principles will enable the pupil to proceed directly to his results, and will enable him to make at pleasure a good or a bad design.

The tastes of this age seem to be in the direction of the use of natural forms for design, either conventionalized or not; and in this respect we differ from preceding generations, which confined their ornament to a small number of conventional forms.

The love of nature is characteristic of the age, and seems to keep pace with the advance of science and knowledge. All plant-forms offer themselves for our use, and the storehouse of nature is inexhaustible.

A SERIES OF DESIGNS

MADE BY

PUPILS IN THE PUBLIC SCHOOLS,

WHOSE AGES AVERAGED ABOUT FIFTEEN YEARS.

Fig. 45.

Fig. 46.

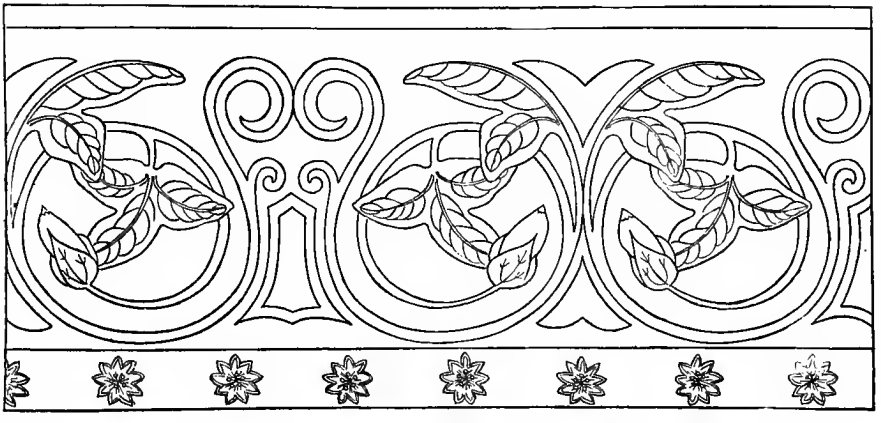


Fig. 47.

Fig. 48.

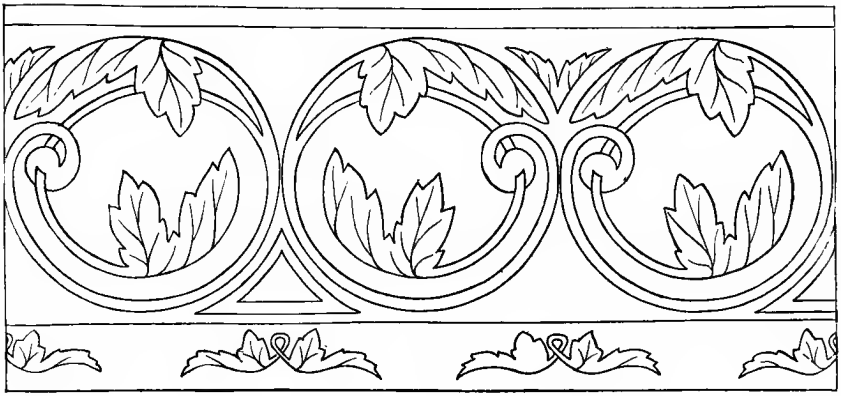


Fig. 49.

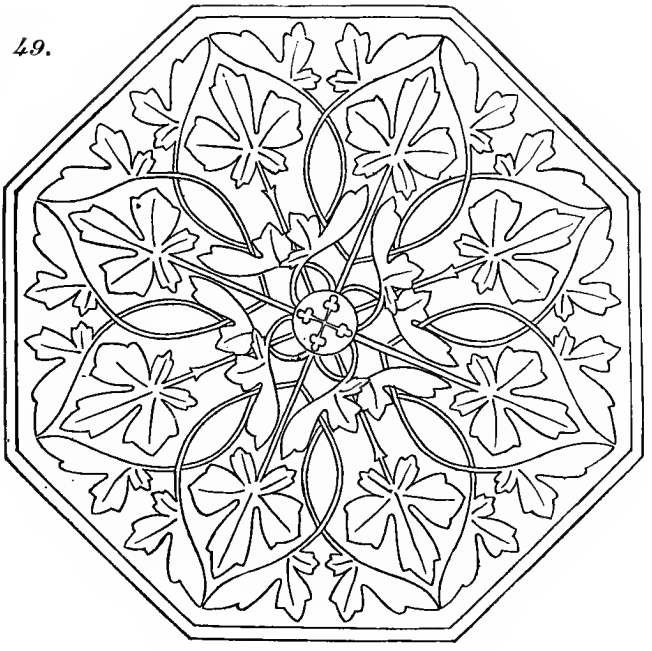


Fig. 50.

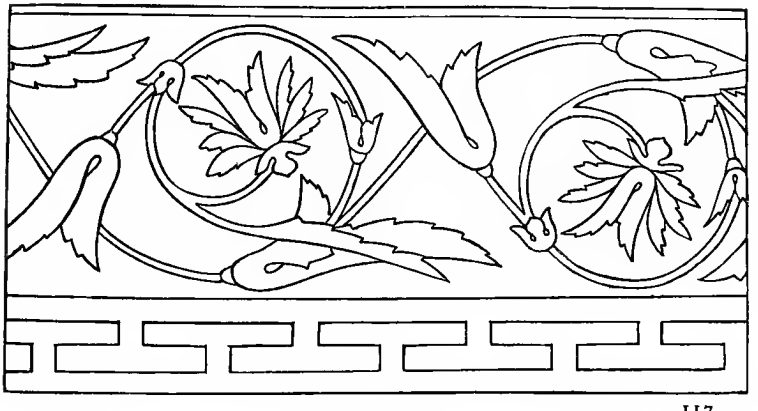


Fig. 51.

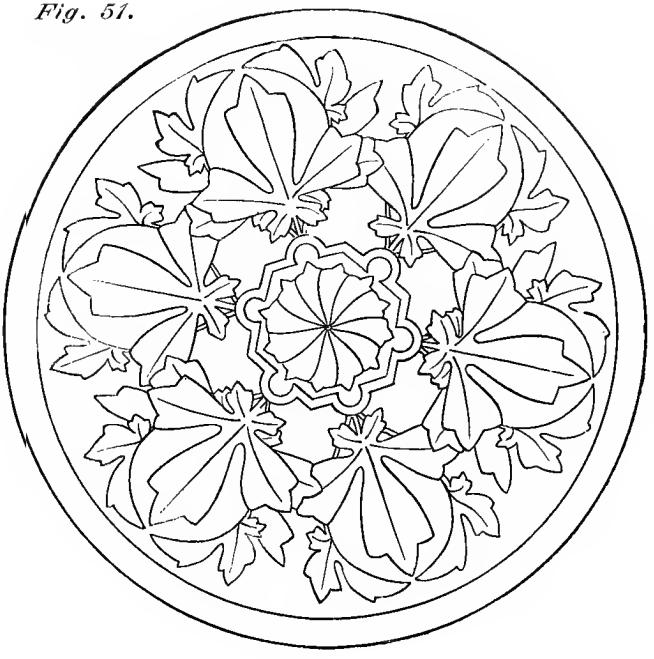


Fig. 52.

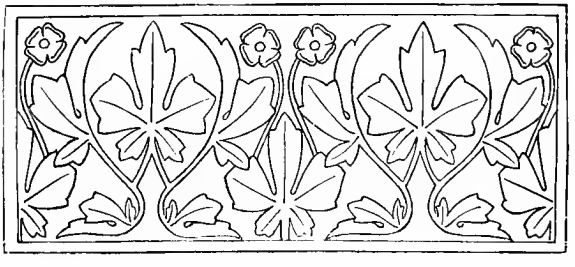


Fig. 53.

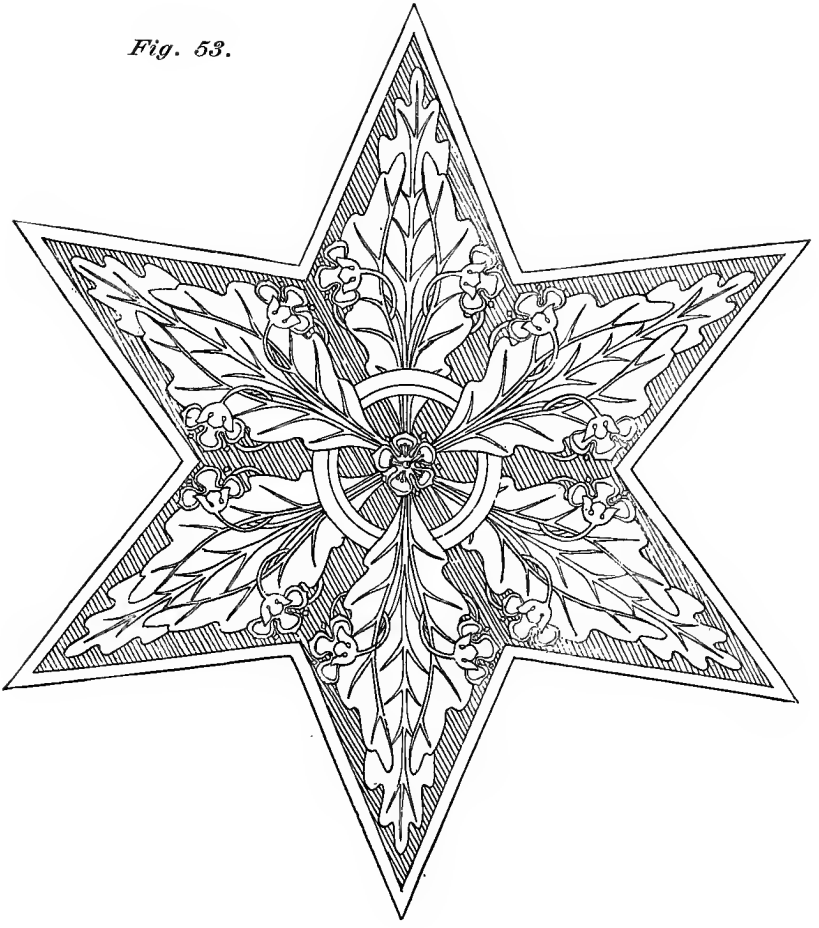


Fig. 54.

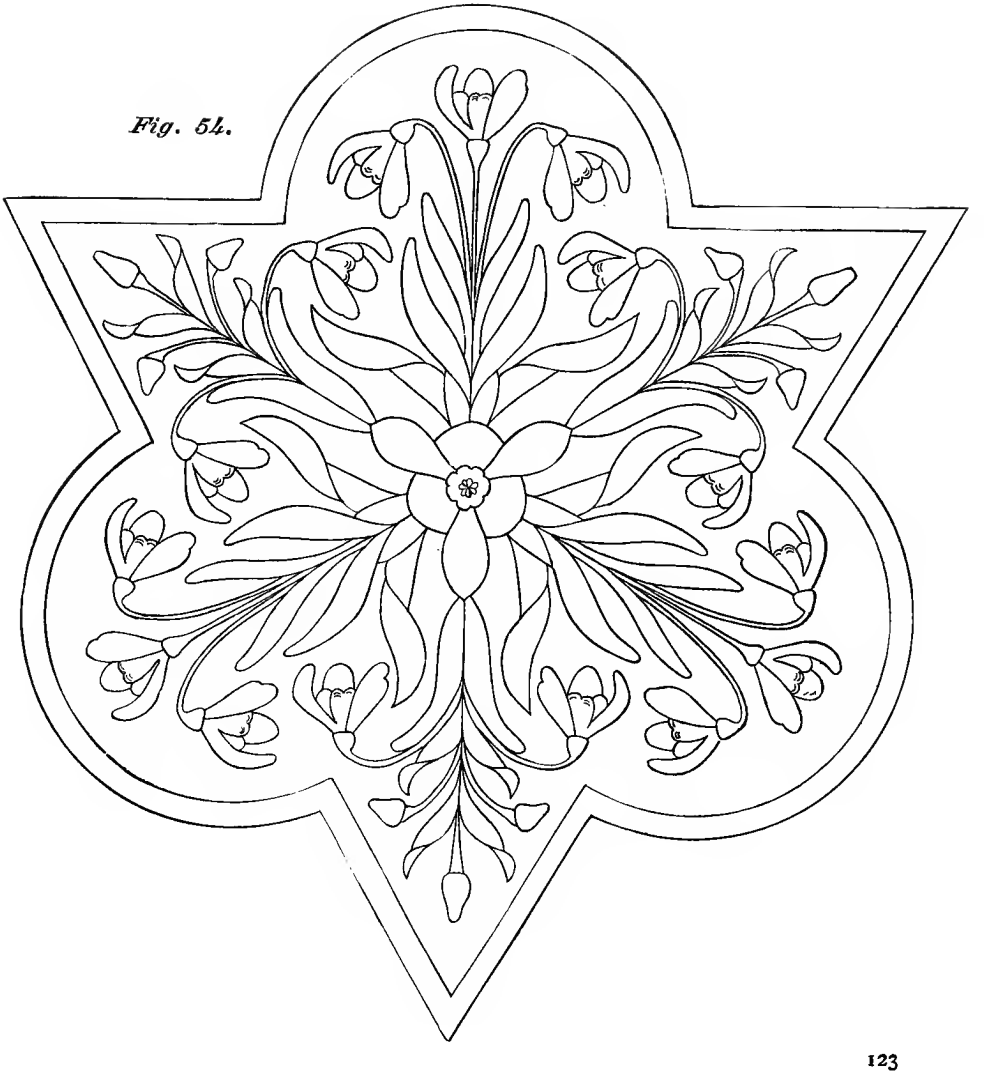


Fig. 55.

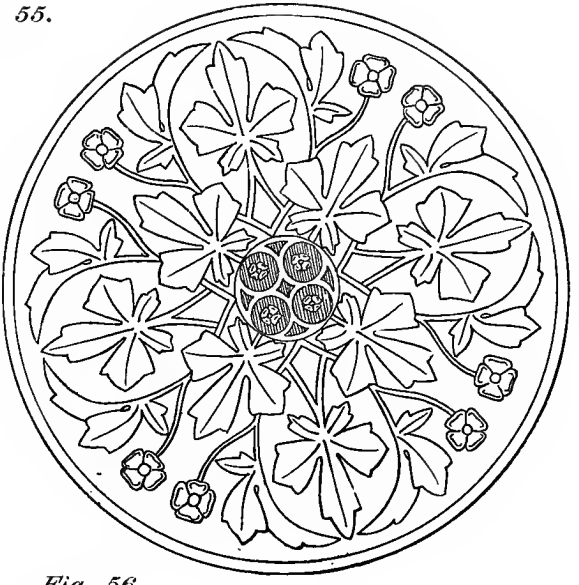


Fig. 56.

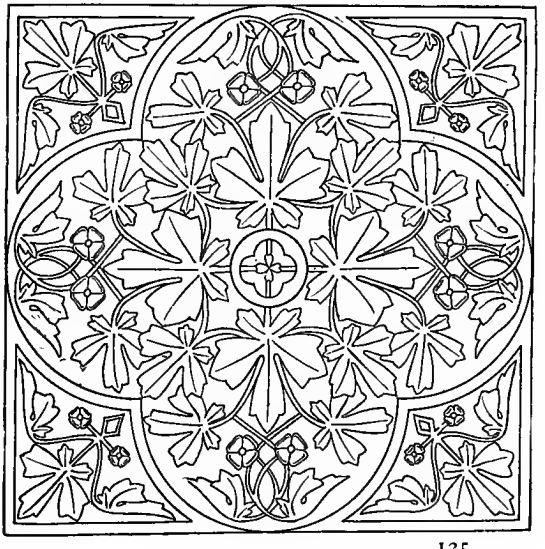


Fig. 57.

Fig. 58.

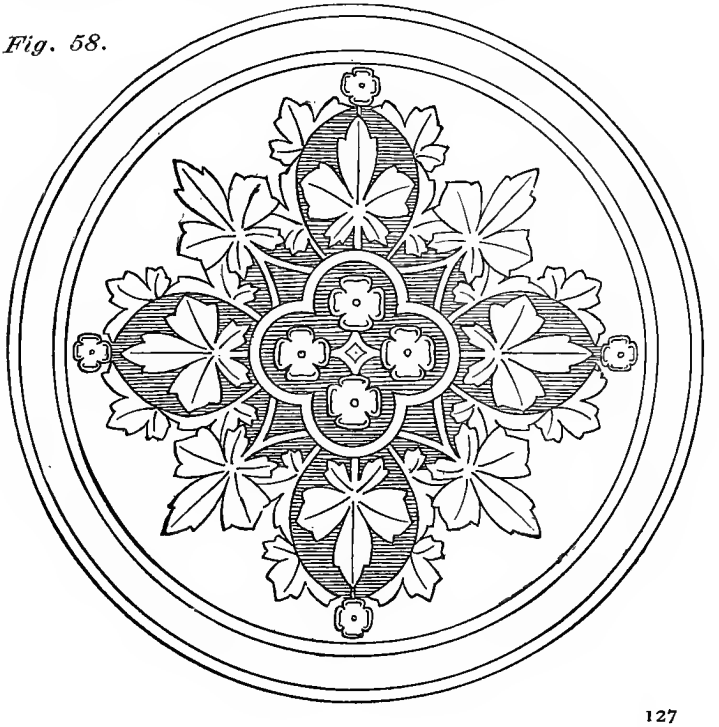


Fig. 59.

Fig. 60.

Fig. 61.

Fig. 62.

Fig. 63.

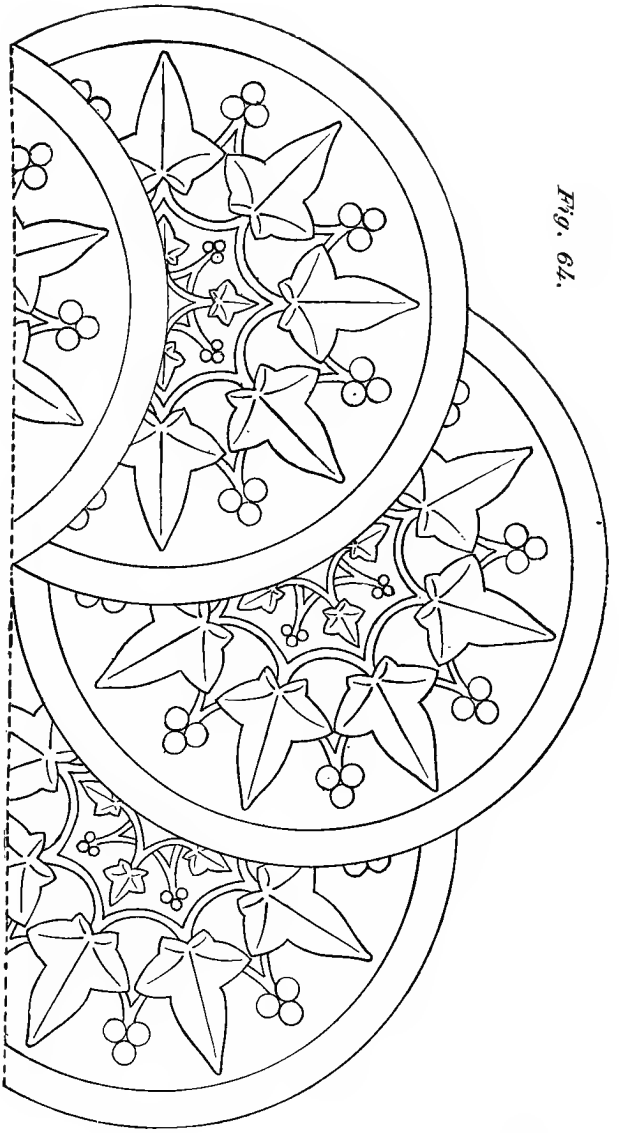


Fig. 64.

Fig. 65.

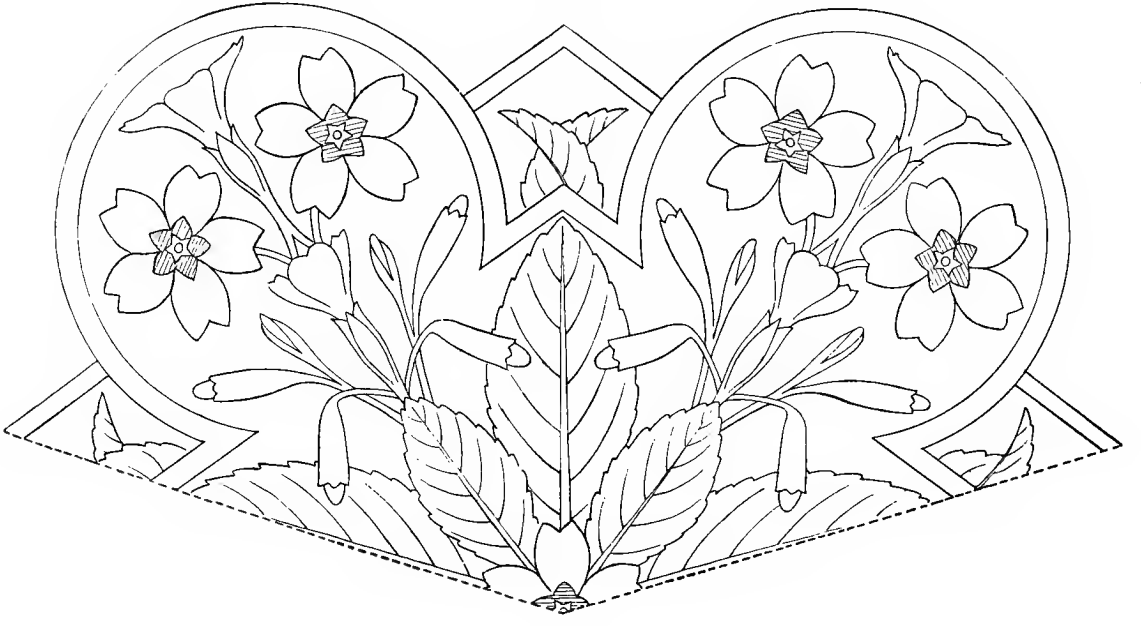


Fig. 66.

Fig. 67.

Fig. 68.

Fig. 69.

Fig. 70.

Fig. 77.

Fig. 72.

Fig. 78.

Fig. 74.

Fig. 76.

Fig. 76.

Fig. 77.

Fig. 78.

Fig. 79.

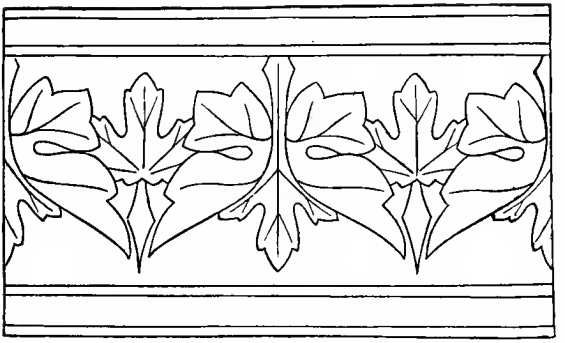


Fig. 80.

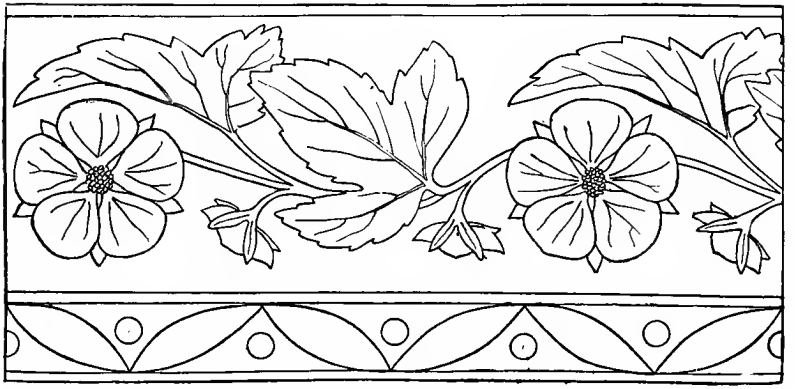


Fig. 81.

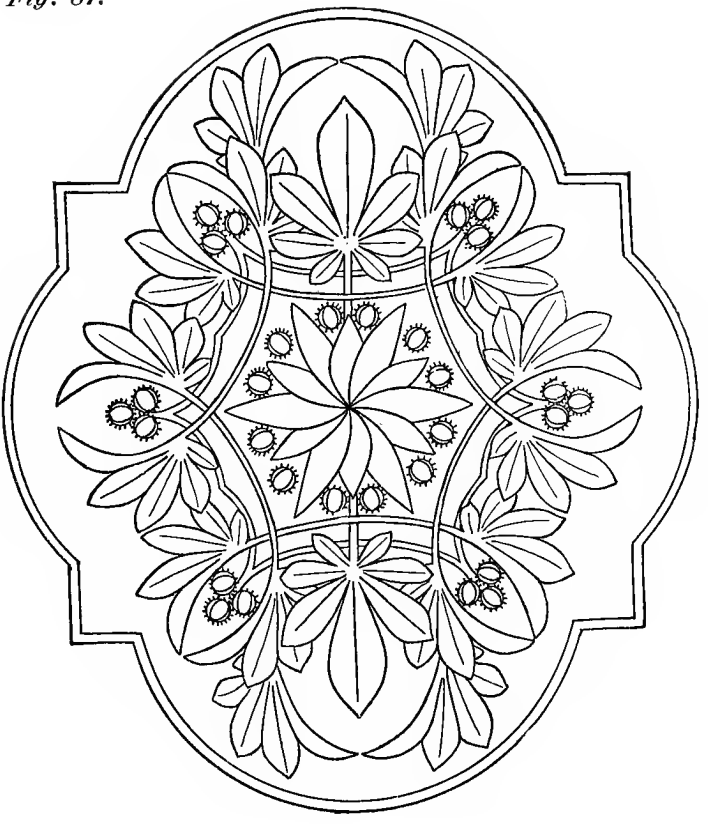


Fig. 82.

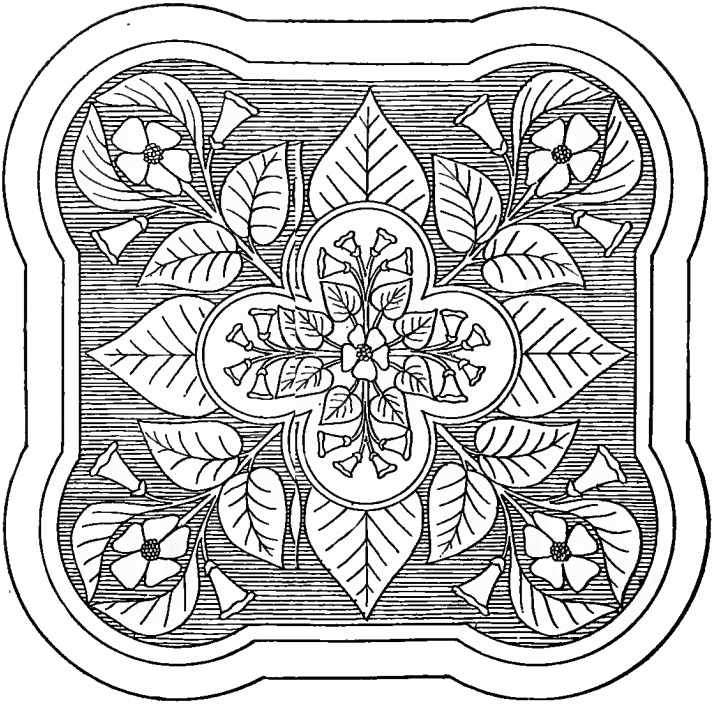
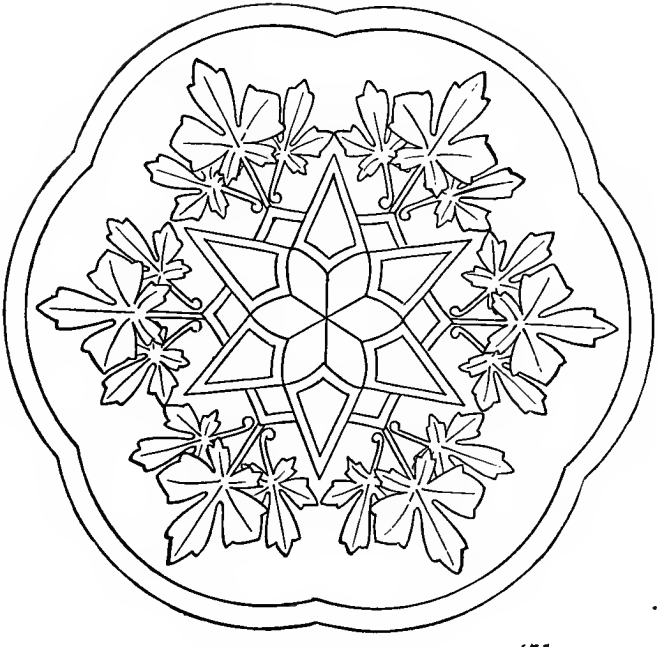
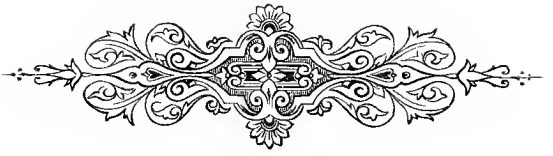


Fig. 83.



PLANT-FORMS FOR THE ELEMENTS OF DESIGN.



List of Plant-Forms.

THE plant-forms here given were drawn direct from nature, with one or two exceptions. The natural pictorial forms are given; because it is essential to a proper use of plant-forms in design, that the lines of growth, which express the life and energy of each plant, should be before the designer, in order that he may incorporate them into his work.

The ornamental form is not always given separate from the pictorial; form as in the latter the front or side view of flowers, buds, and leaves often appears; and in these cases such forms are not repeated as conventional forms. The series of plant-forms gives a good variety for all the purposes of design as required for public-school use. Both teacher and pupil should select such a plant as would be best suited to the particular design under construction. Some are pliant, vine-like plants, appropriate for any representation where a continuous stem is required through considerable space. Others are sprig-like, and are

suited to more restricted use. There are broad-leaved plants and large-flowered plants, which lend themselves kindly to the filling of broad spaces.

There are rugged forms and delicate forms, each suited to special uses, such as every designer will readily understand.

The list might have been extended so as to include many more plant-forms, which are very desirable to have at hand. But, incomplete as it must of necessity be, it is still large enough, it is believed, to afford suitable material for the uses of public schools and schools of design.

Fig. 84.

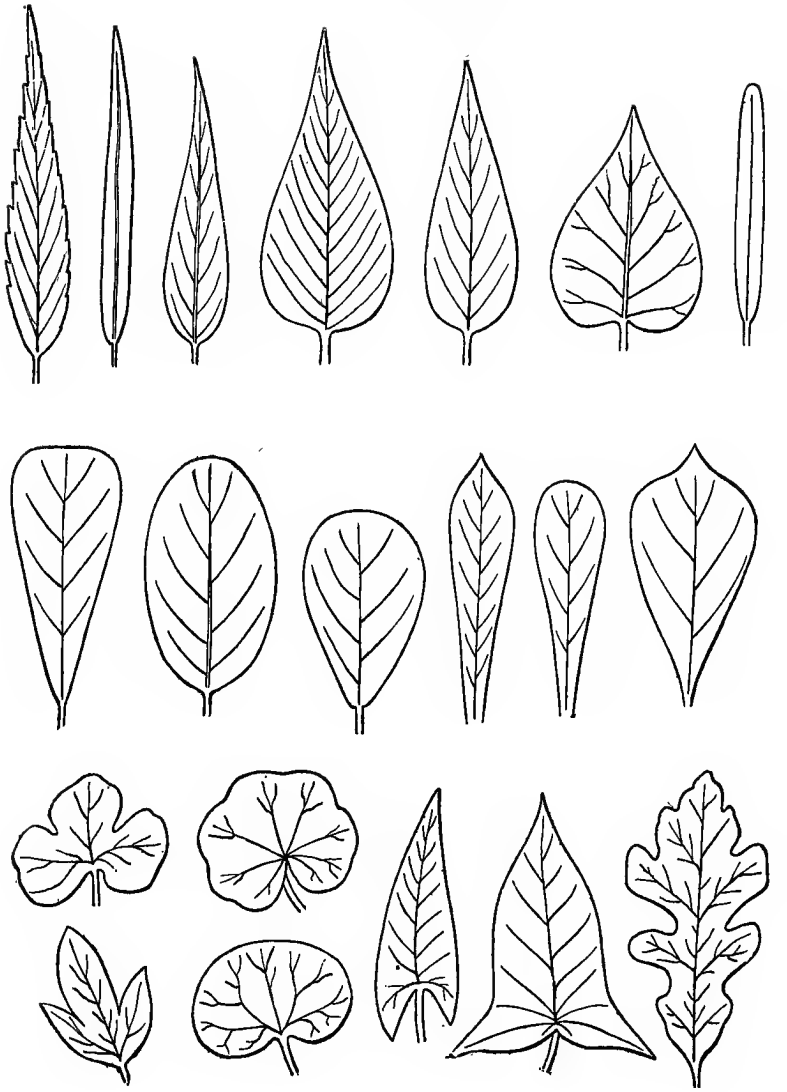
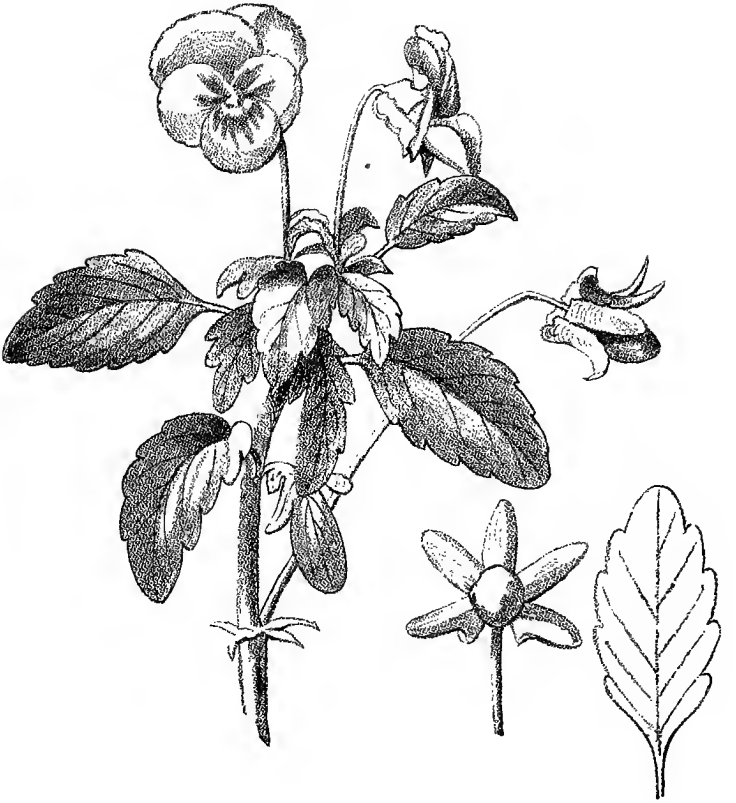


Fig. 85.

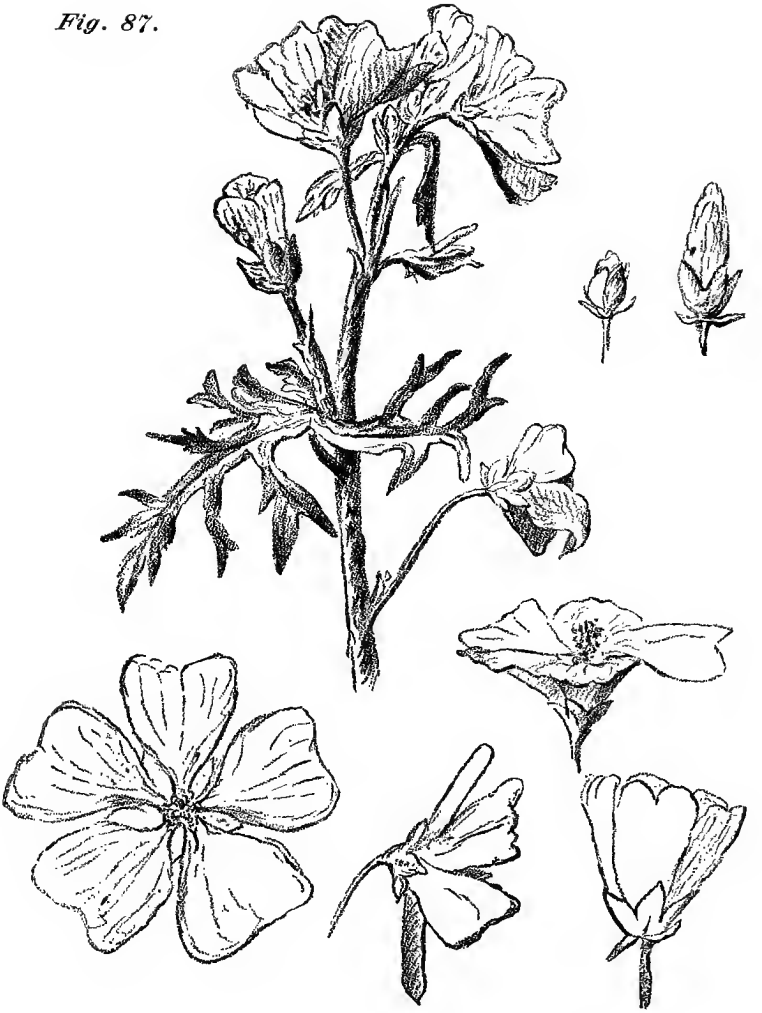


Pansy.

Fig. 86.

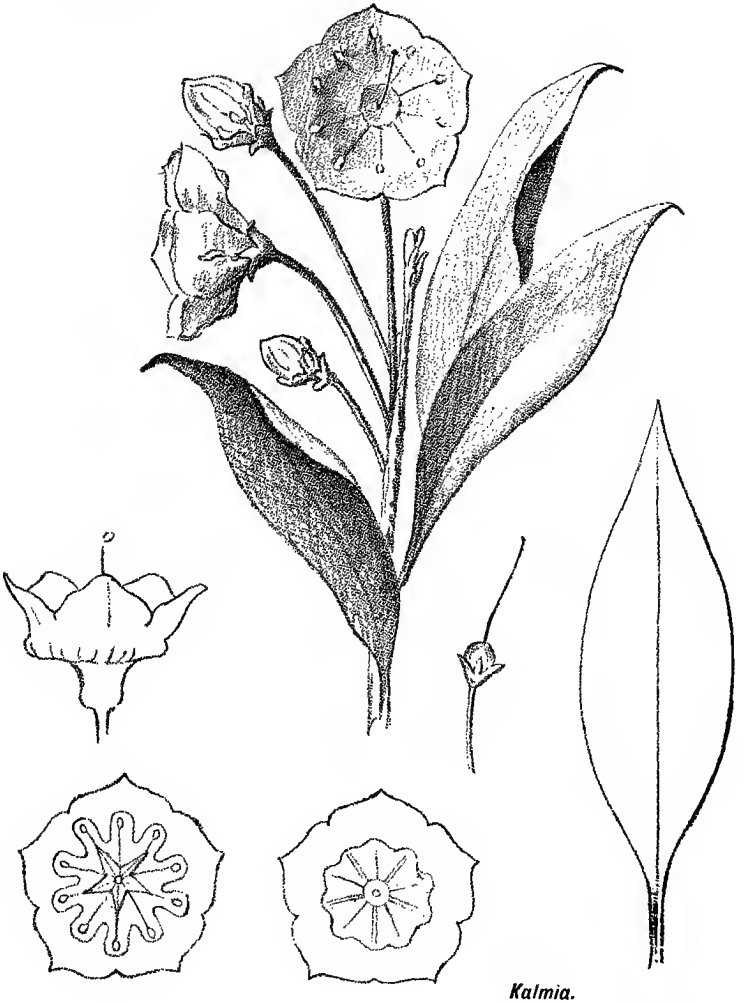
Sweet Pea.

Fig. 87.



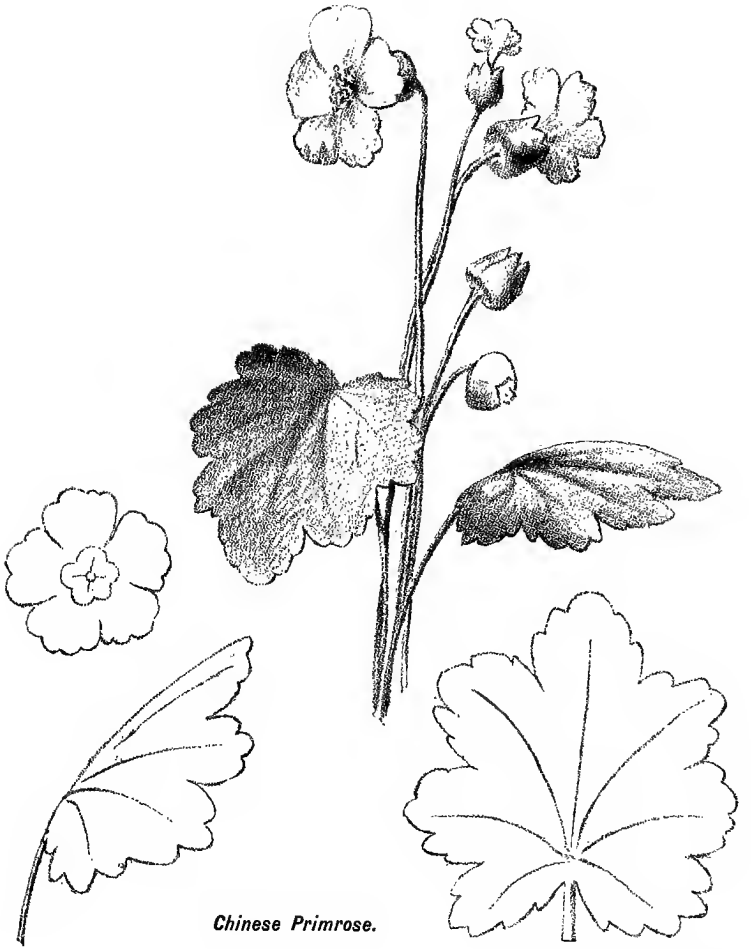
Agrimony.

Fig. 88.



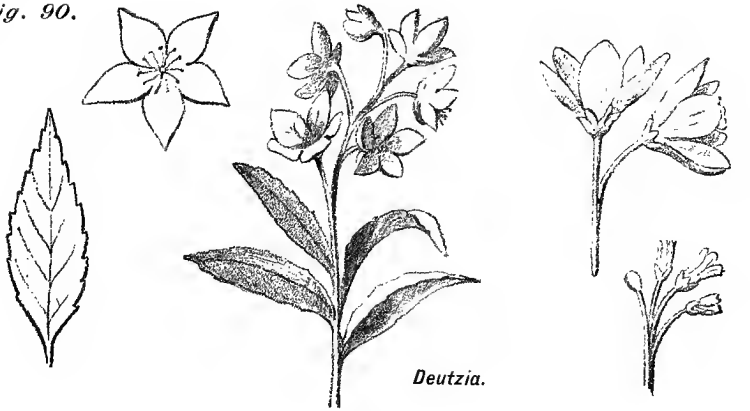
Kalmia.

Fig. 89.



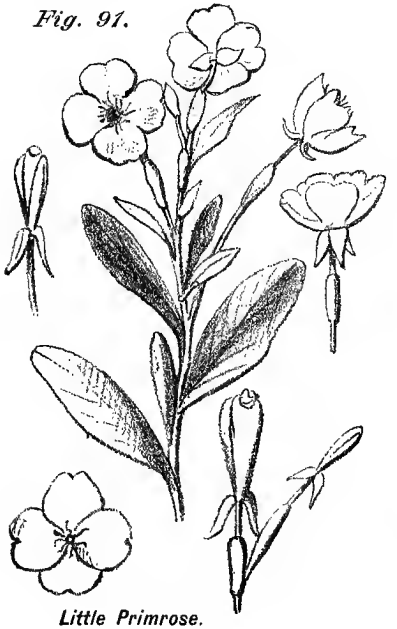
Chinese Primrose.

Fig. 90.



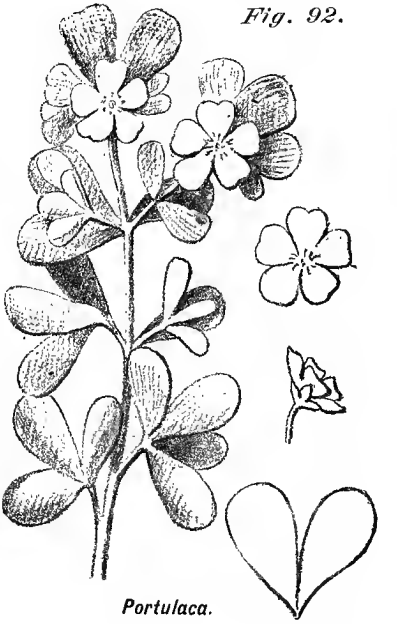
Deutzia.

Fig. 91.



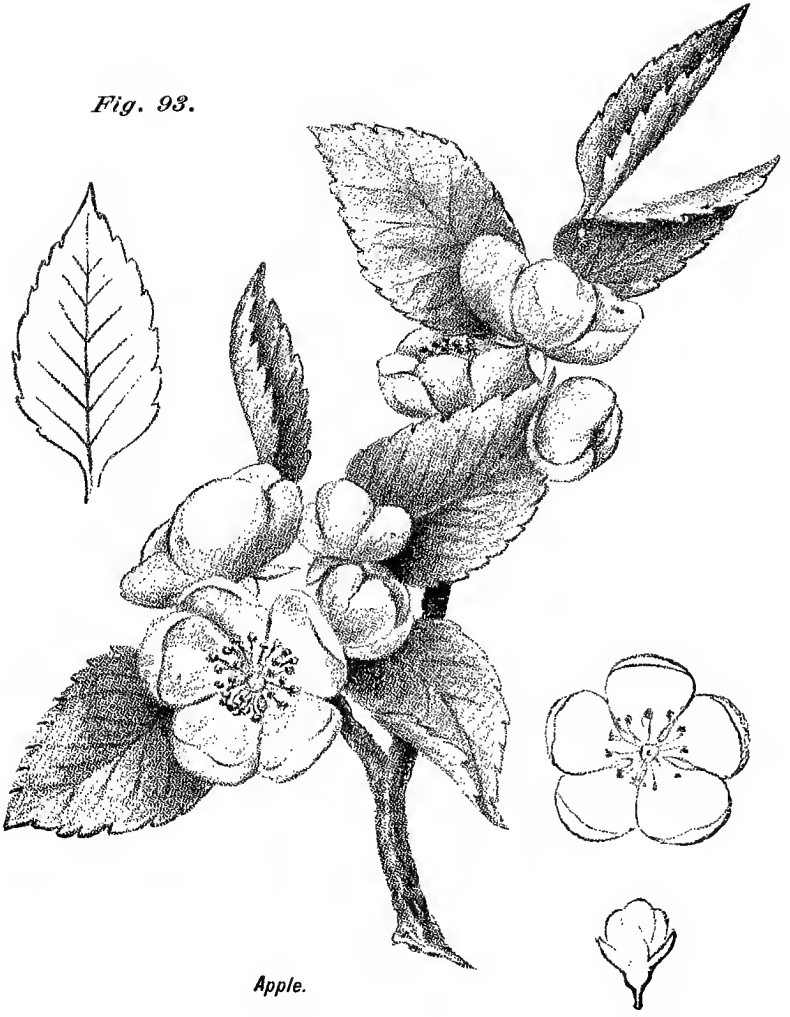
Little Primrose.

Fig. 92.



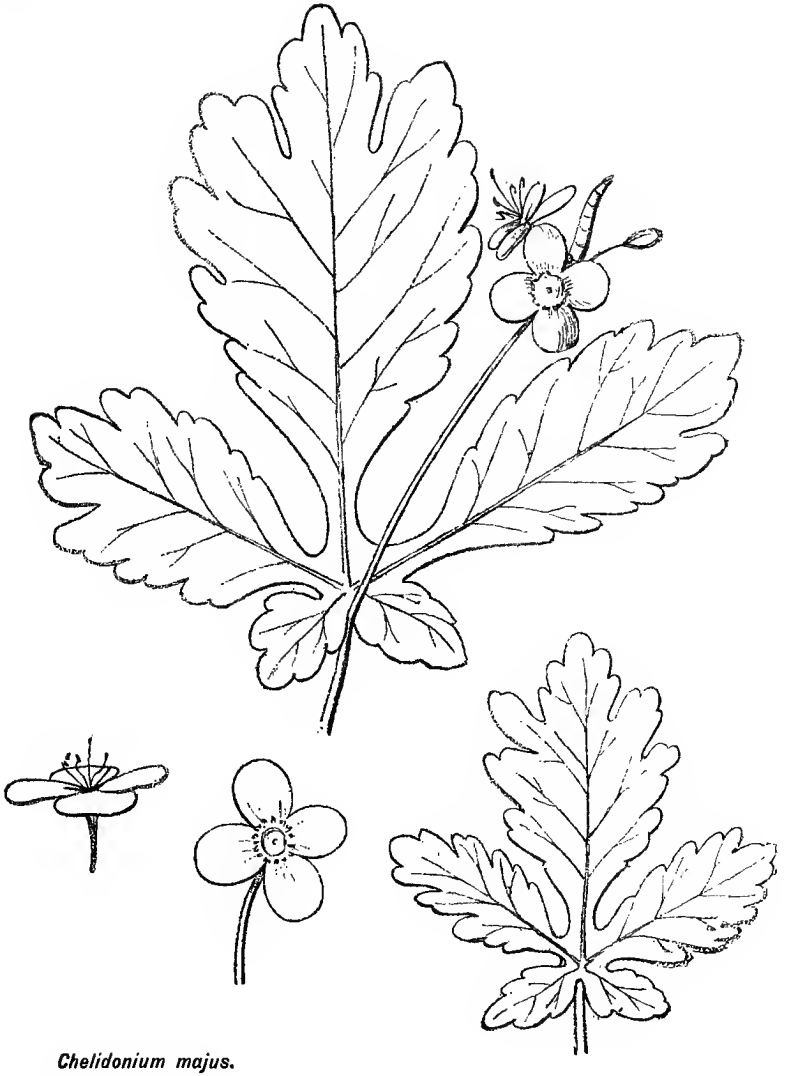
Portulaca.

Fig. 93.



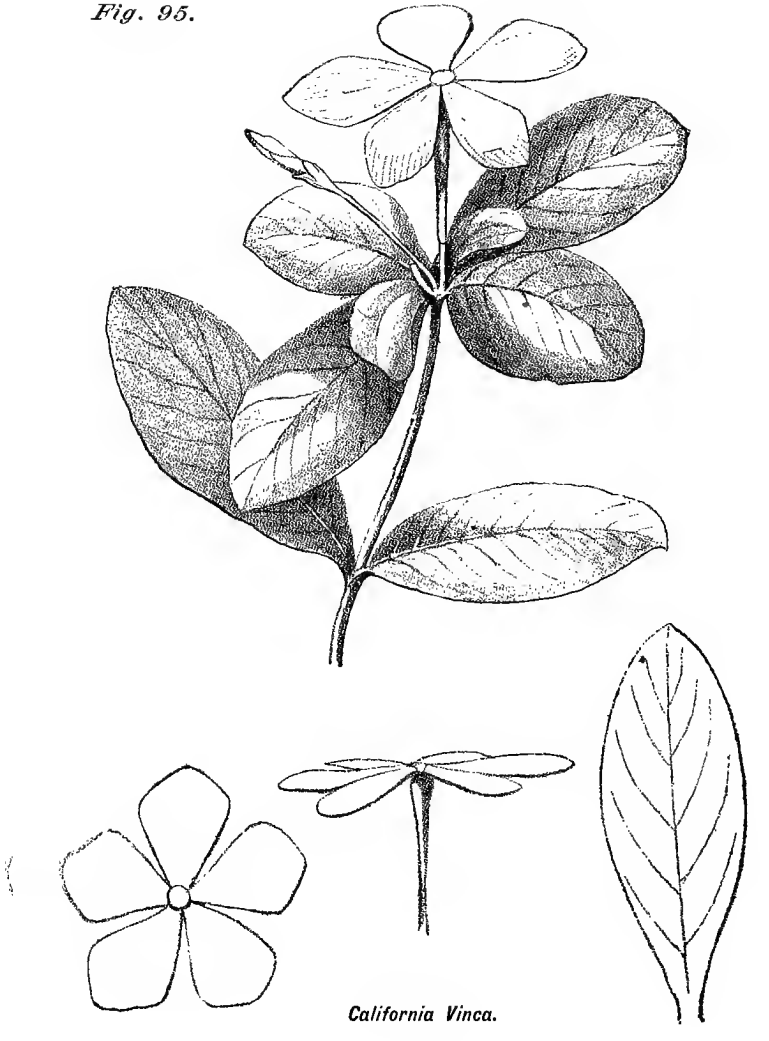
Apple.

Fig. 94.



Chelidonium majus.

Fig. 95.



California Vinca.

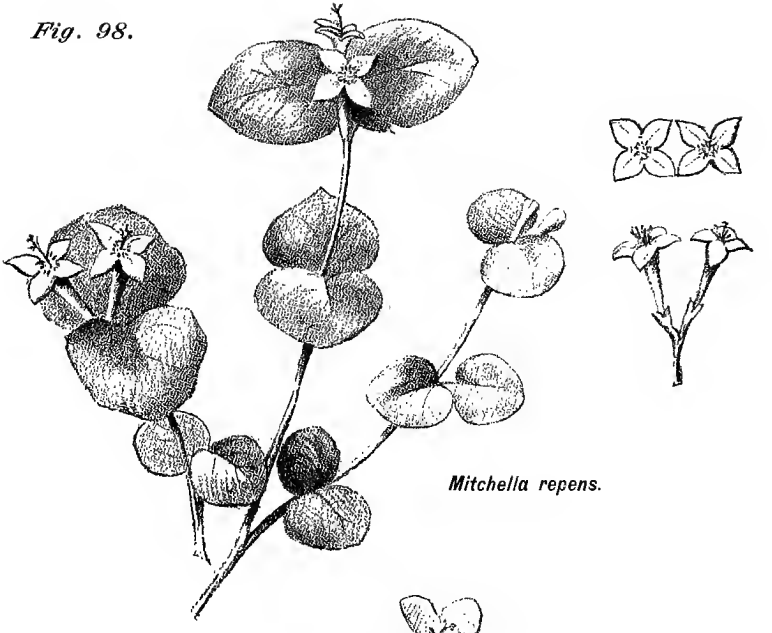
Fig. 96.

Petunia.

Fig. 97.

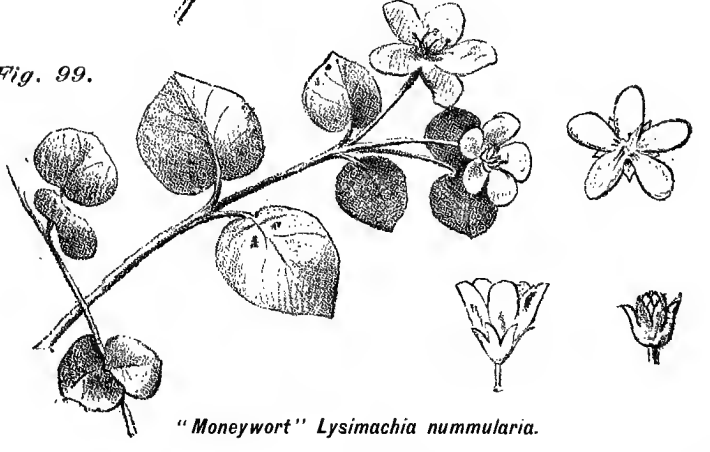
Mimulus ringens.

Fig. 98.



Mitchella repens.

Fig. 99.



"Moneywort" Lysimachia nummularia.

Fig. 100.

Acrolinium.

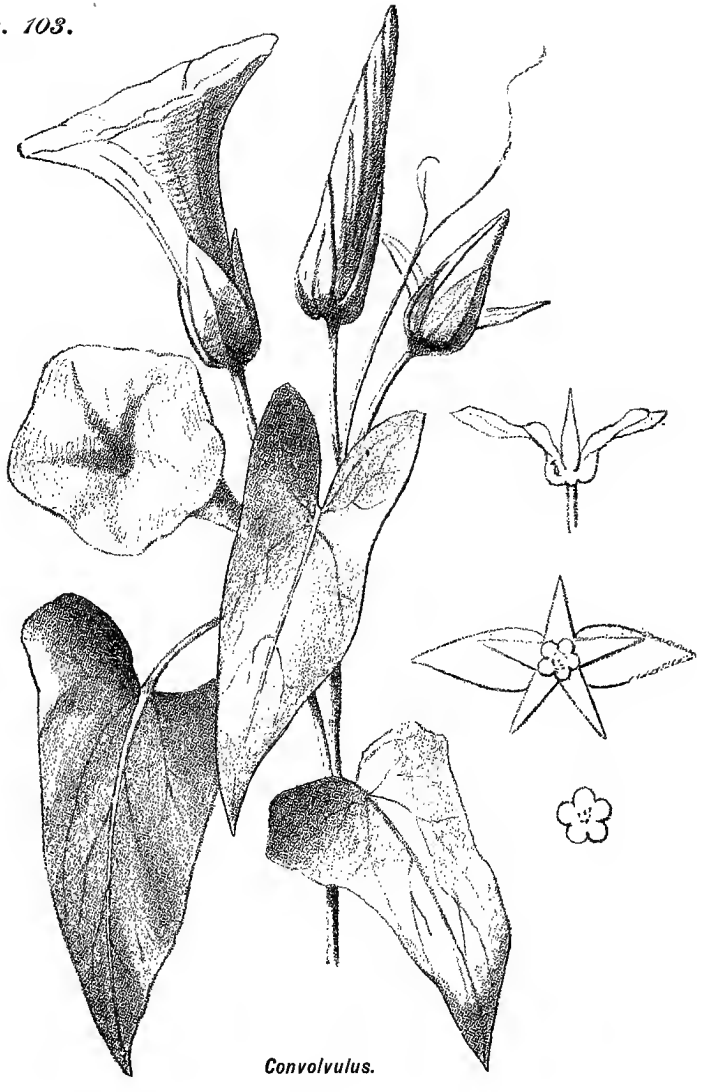
Fig. 101.

Clintonia borealis.

Fig. 102.

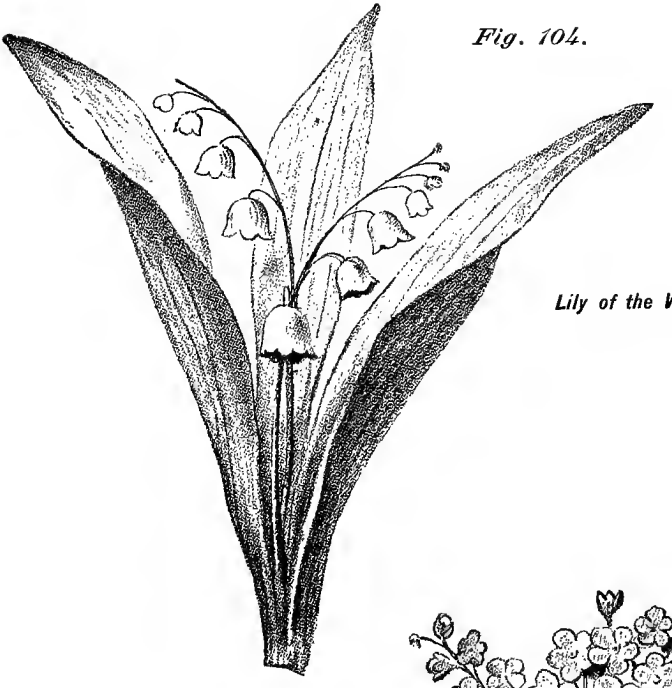
Cardinal Flower.

Fig. 103.



Convolvulus.

Fig. 104.



Lily of the Valley.

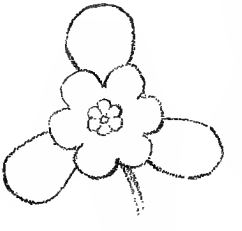
Fig. 105.

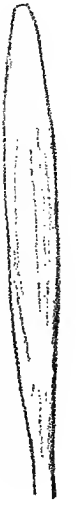
Forget-me-not.

Fig. 106.

Fig. 107.

Star of Bethlehem.





Snowdrop.

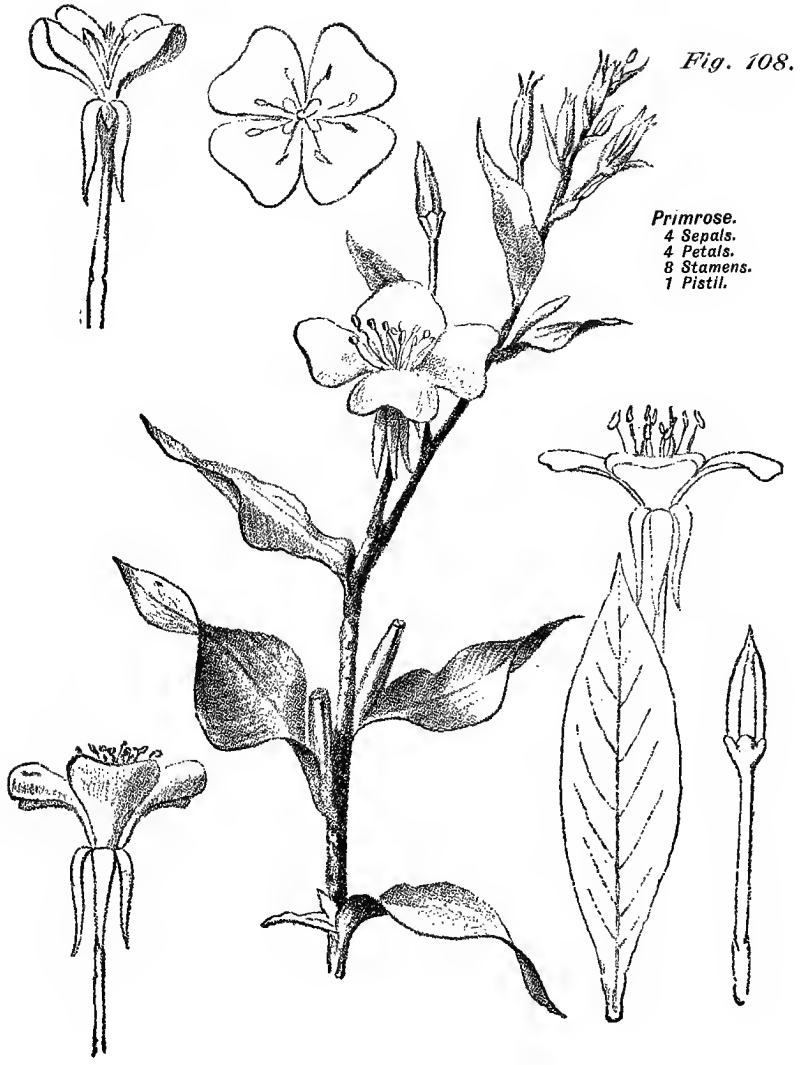


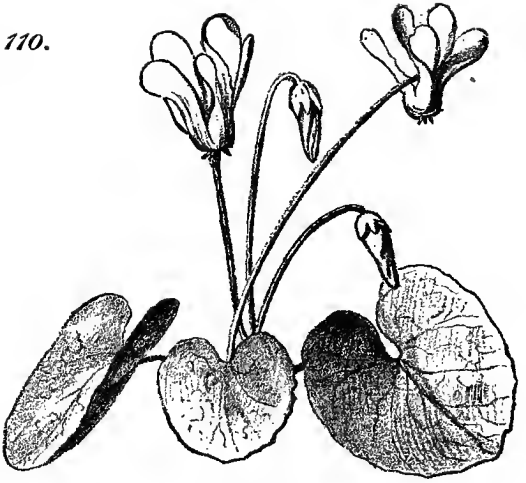
Fig. 108.

Primrose.
4 Sepals.
4 Petals.
8 Stamens.
1 Pistil.

Fig. 109.

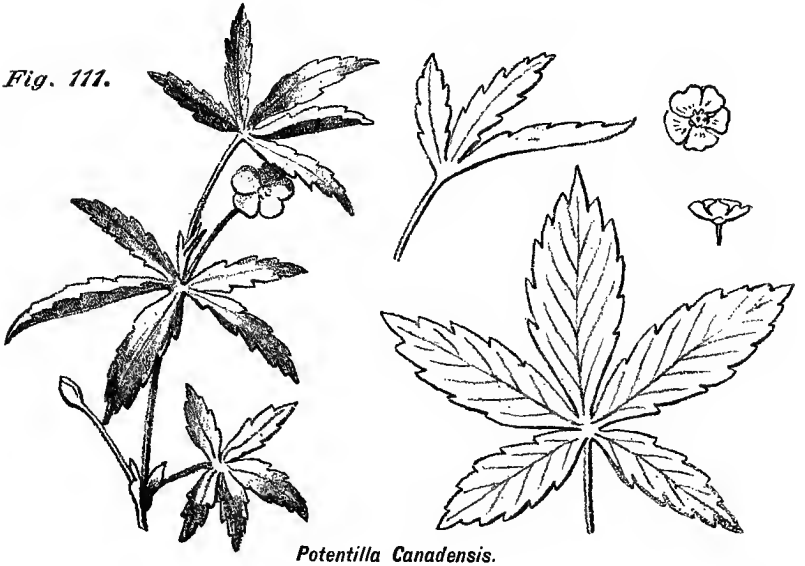
Blackberry.

Fig. 110.



Cyclamen.

Fig. 111.

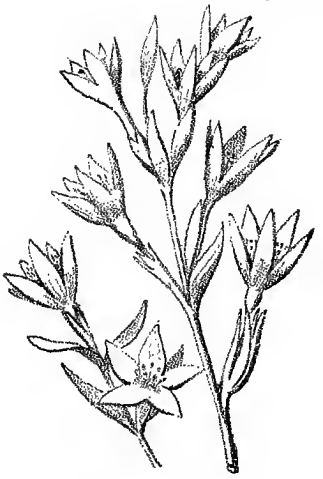


Potentilla Canadensis.

Fig. 112.

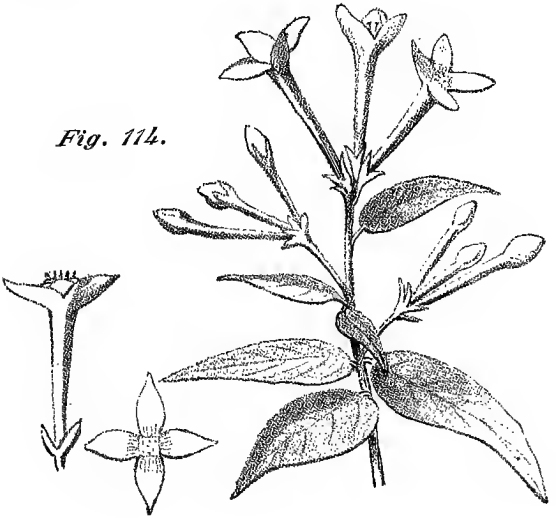
Potentilla argentea.

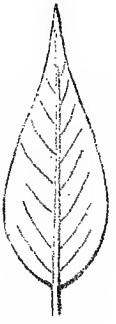
Fig. 113.



Erythraea tricantha.

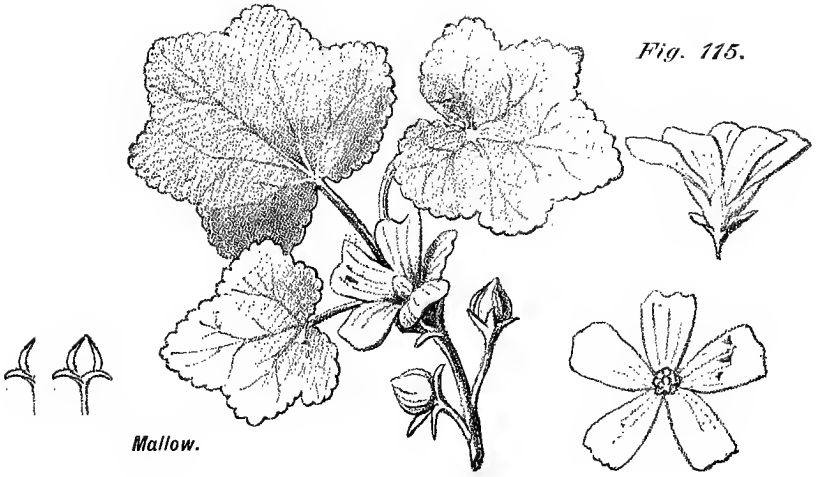
Fig. 114.





Bouvardia.

Fig. 115.

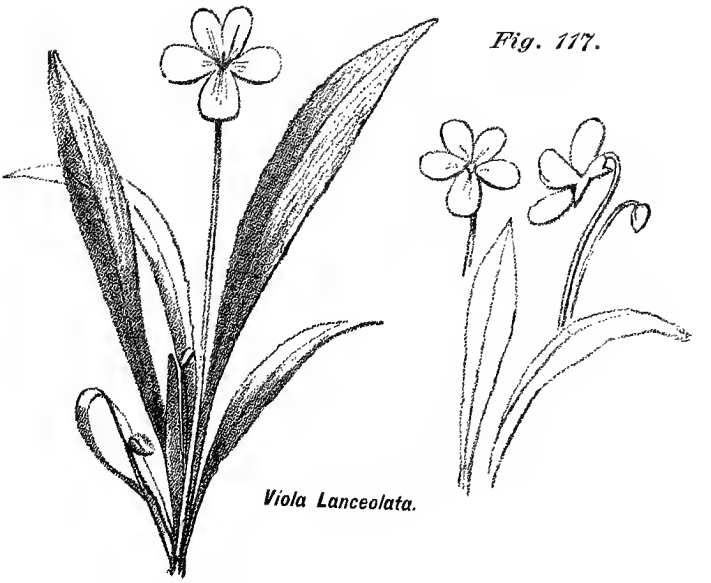


Mallow.

Fig. 116.

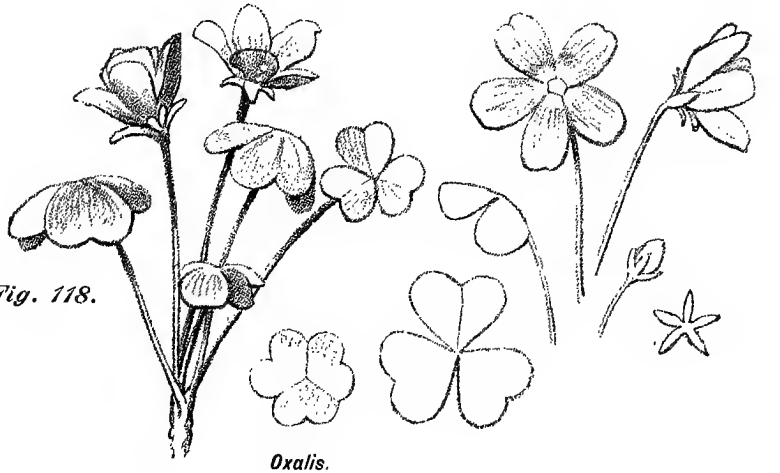
"Margaretta."

Fig. 117.



Viola Lanceolata.

Fig. 118.



Oxalis.

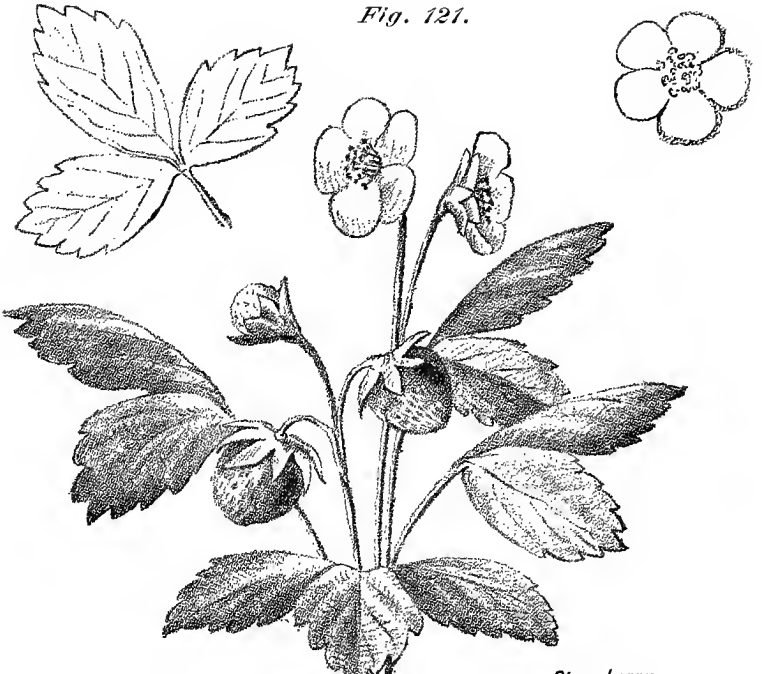
Fig. 119.

Pink.

Fig. 120.

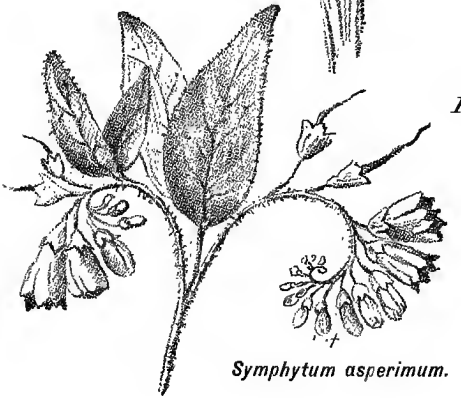
Malvastrum marruboider.

Fig. 121.



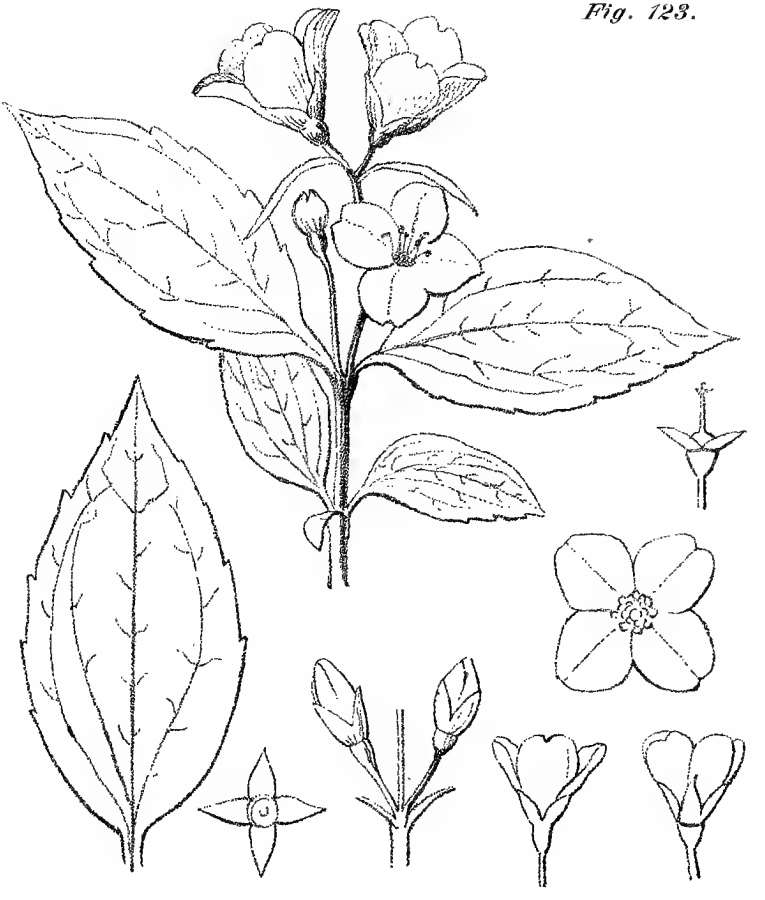
Strawberry.

Fig. 122.



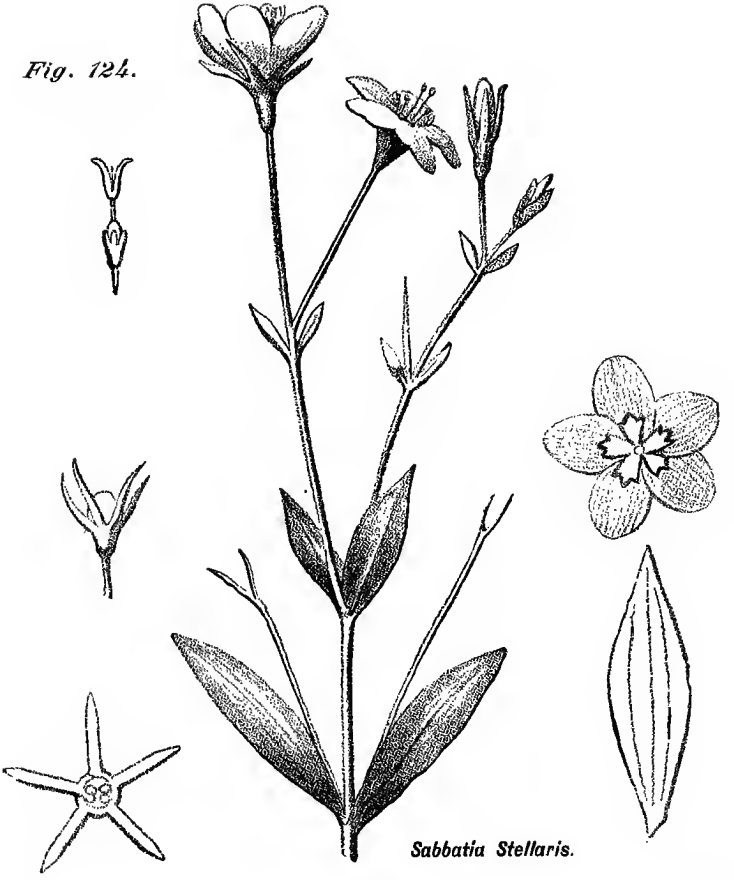
Symphytum asperimum.

Fig. 123.



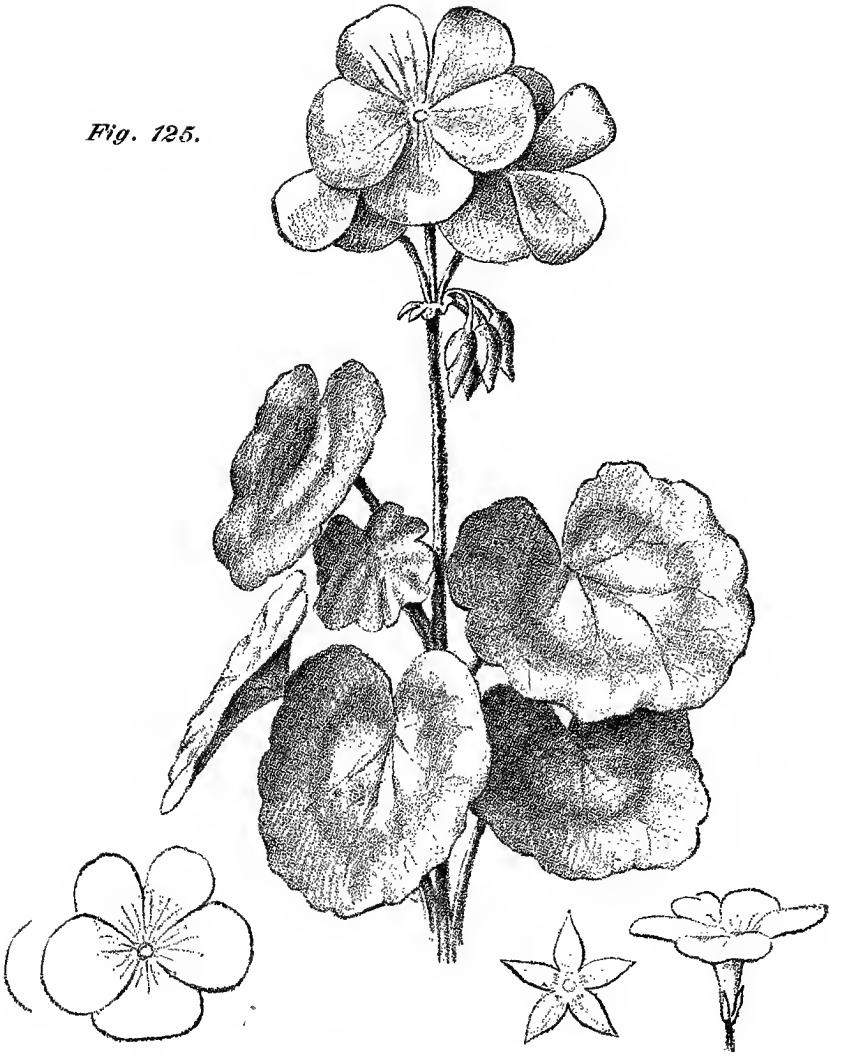
Syringa, Philadelphus Coronarius.

Fig. 124.



Sabbatia Stellaris.

Fig. 125.



Geranium.

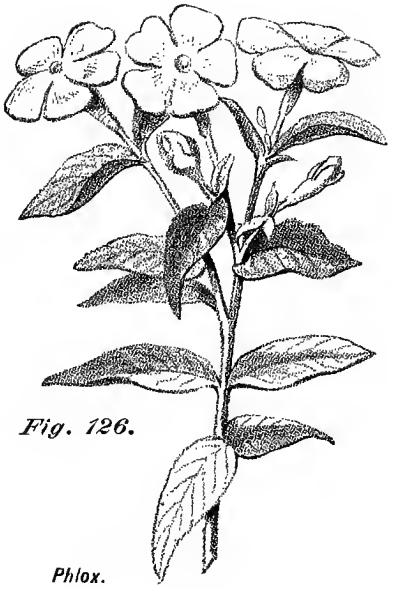


Fig. 126.

Phlox.

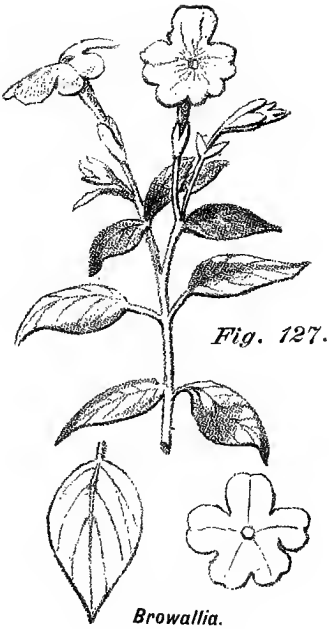


Fig. 127.

Browallia.

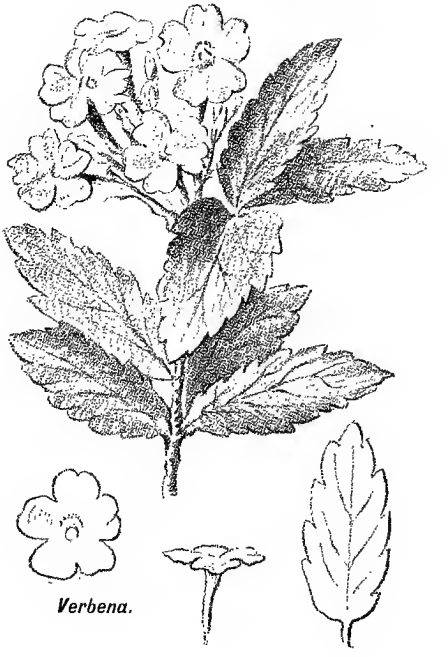
Fig. 128.

Succory.

Fig. 129.

Silena.

Fig. 130.



Verbena.

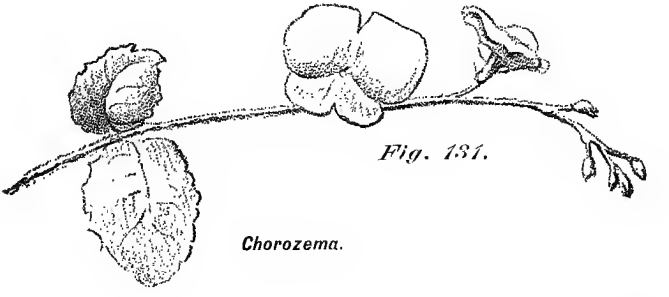
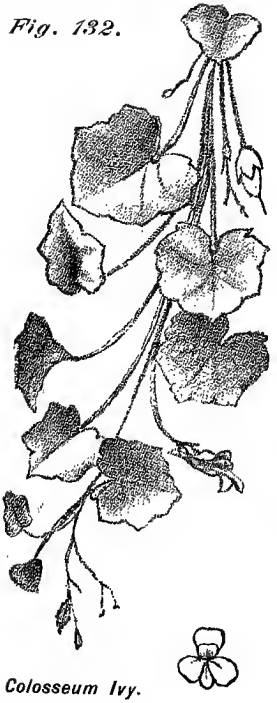


Fig. 131.

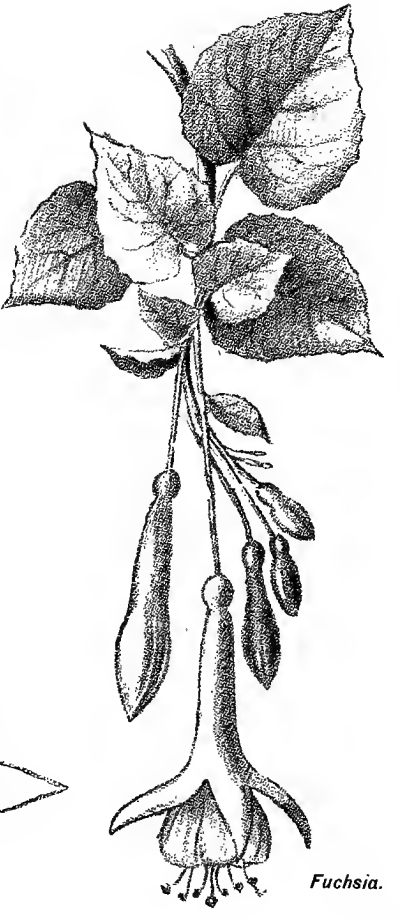
Chorozema.

Fig. 132.



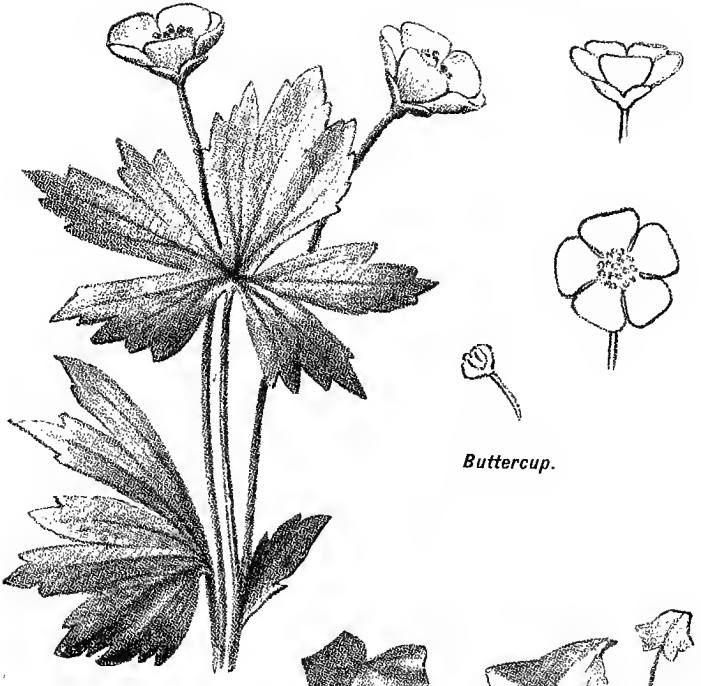
Colosseum Ivy.

Fig. 133.



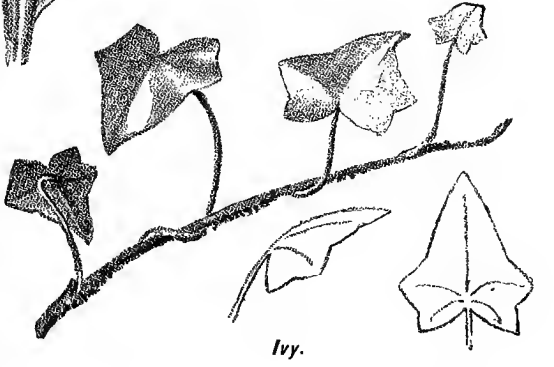
Fuchsia.

Fig. 134.



Buttercup.

Fig. 135.



Ivy.

Fig. 136.

Coreopsis.

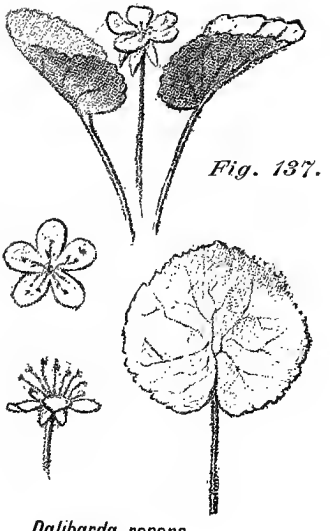


Fig. 137.

Dalibarda repens.

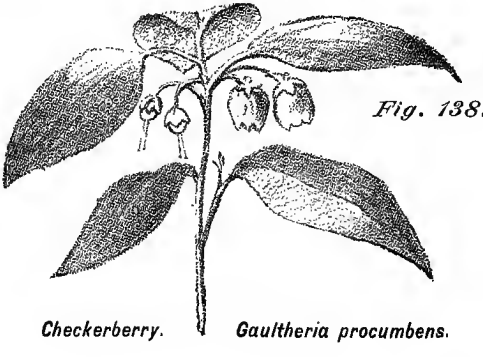


Fig. 138.

Checkerberry. Gaultheria procumbens.